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Radio—Spreading the Word on Family Planning

Editors' Summary. Radio reaches almost everybody. Worldwide, there are an estimated 1,600 million radio receivers—one for every three people—and nearly 32,000 radio stations. Thus radio has great potential to bring family planning and related health messages to the world's people. On the whole, this potential is underutilized. A number of new projects are putting radio to work for family planning, however. Combined with other channels of communication, radio is now speaking directly to men, women, and young people about the benefits of family planning.

New creative approaches are being used. In Latin America songs by two popular young artists, Tatiana and Johnny, encourage sexual responsibility among young people. They hit the radio popularity charts in early 1986. In Jamaica *Naseberry Street*, a soap opera set in a family planning clinic, attracts a large and loyal audience. In Costa Rica *Diálogo*, a long-running, popular show, uses interviews, dramatizations, panel discussions, and listeners' letters to discuss family planning and family relationships. In Indonesia a soap opera, *Grains of Sand in the Sea*, brings family planning messages to the public over more than 100 radio stations. In Zimbabwe the four national radio channels carry family planning information and dramas for different audiences and in different languages. In Bangladesh, India, Indonesia, Nepal, the Caribbean, El Salvador, Guatemala, Honduras, Jamaica, Mexico, Egypt, Ghana, and elsewhere, contraceptive social marketing programs advertise their products on radio as well as in other media. Family planning broadcasts are having an impact. For example, they have increased inquiries to youth guidance centers in Latin America, lengthened contraceptive use in Honduras, increased clinic attendance in Nigeria, improved attitudes toward condoms in Colombia, and brought clients to private-sector services in Hong Kong and Egypt.

Achieving Good Quality

Producing persuasive family planning materials for radio requires good quality in both content and presentation. Creative imagination makes the communication interesting, entertaining, or attention-getting. The principles of good communication require that communicators learn *from the audience* what is meaningful and convincing. Mass media communication is a process consisting of initial research and analysis, design, message development, pre-testing, implementation, and evaluation. Audience research and constant feedback are essential throughout. Communication professionals often can help public health programs and family planning agencies to achieve good-quality content and presentation. Good quality need not be expensive. Family planning organizations can develop useful radio projects with big or small budgets.

Radio and Other Communication Channels

Radio is only one of many channels for family planning communication. Communication efforts that use multiple media reach the most people and best reinforce the message. When closely tied to service delivery, such multimedia efforts can increase contraceptive use. The role of radio, together with press, television, billboards, print materials, and personal communication, depends on goals, costs, access to broadcasting, and how well radio reaches intended audiences. But radio is always an attractive medium because almost everyone listens to radio; radio has an attention-getting immediacy that makes it convincing; and radio programing is flexible. If family planning communicators learn how to use radio better, radio can play a bigger role in promoting family planning, child spacing, and child survival. **End of Editors' Summary.**

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WHY RADIO?

On a Mexico City street youngsters hold transistor radios to their ears. In Kenya tribesmen keep radios on the ground near them while tending cattle. In rural Thailand primary school students in a one-room school study arithmetic by radio. In Manila taxicab, jeepney, and bus drivers charge through traffic with radios turned up full-blast. For most people in developing nations, radio is the primary link to the rest of the world. And what people hear on radio powerfully influences what they talk about, what they think, what they buy, and how they behave. Thus radio offers important opportunities for family planning and other social programs.

These opportunities come at a time when family planning programs increasingly recognize the importance of effective communication:

- to broaden and sustain people's interest in family planning;
- to reach new audiences, such as men and young people, who rarely come to health centers, or women who stay close to home;
- to tell people where they can find supplies and services;
- to meet the special needs of consumer-oriented programs such as social marketing and community-based distribution (CBD) of contraceptives;
- to counter harmful rumors and misinformation about contraceptive methods; and
- to offer alternatives to commercial mass media messages that glorify sexual irresponsibility.

For these reasons family planning professionals are considering radio—used in coordination with other channels of communication—with new enthusiasm.

This issue of Population Reports was prepared by Richard H. Gilluly and Sidney H. Moore, Ph.D., on the basis of published and unpublished materials, correspondence, and interviews. Comments and additional material are welcome.

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Radio Reaches the Largest Audiences

There are an estimated 1,650 million radios in the world, or one radio for every four people (25). This figure is approximate, and the distribution of radios is very uneven, but it is clear that the reach of radio is broad. In Latin America, for example, there is one radio for every three people; in Asia and in sub-Sahara Africa, one for every 10 (25) (see Table 1, p. J-856). Even in some of the poorest nations there are many radio stations broadcasting long hours in local languages, and they have many listeners. There are now radio receivers in most households, sometimes even in remote areas, and others often have access to community radios. For example, in 1982 over 50 percent of households in parts of rural Pakistan had radios (127), and in Egypt 84 percent of households have radios (25).

There are many reasons that radio reaches so many people. People like to listen to radio because:

(1) Radio programing is often entertaining, intriguing, or informative.
(2) Radio listening is convenient; you can listen to the radio while doing other things, and it provides pleasant background entertainment. Also, modern radios can easily be carried anywhere.
(3) Inability to read is no barrier to radio listening.

At the same time, many people *can* listen to radio because receivers are inexpensive. While prices vary enormously, simple radios may sell for as little as $1.40 (US), as reported in the Philippines. Where import duties, taxes, and foreign exchange problems make radios costly, as in many African countries, there is a thriving trade in cheaper, smuggled radios (62). Many governments encourage radio ownership because they can reach the public easily, directly, and immediately by radio. In Ghana, for instance, the government sells, at below cost, radios that can be tuned only to government stations (114).

Other Advantages

In addition to its general appeal and broad coverage, radio has other specific advantages for family planning and other development communication:

- Radio is credible and influential. Hearing information via mass media bestows a legitimacy not always achieved in personal communication.
- Radio can reach more people more cheaply and more often than field workers or other mass media.
- With receivers so common, radio reaches places and social groups that have access to no other mass me-

dia. Furthermore, radio informs all those listeners equally.

- Radio can repeat messages often, which helps listeners remember them.
- Radio messages reach casual listeners—those who did not seek out these messages. People who listen for entertainment can hear information and educational messages intermixed with entertainment or presented in entertaining ways. Thus radio listeners often learn without intending to.
- Radio programing can be developed quickly to respond to immediate needs—to combat a new rumor, for example, or to announce availability of new family planning services.
- Radio programing is flexible. Many formats, long and short, are available for entertainment, information, and education (see box, p. J-858).
- Air time can sometimes be obtained free of charge. Public service announcements (PSAs) are often aired free (see box, p. J-876). News and feature programs cover important events without charge.
- Radio programs can draw audience participation by mail or telephone in some areas.
- High-quality radio programs, while not cheap to produce, are cheaper than films or television. One skilled radio professional with a good tape recorder can produce high-quality material for radio.
- Audio tapes for radio broadcast are cheap and can be easily duplicated, stored, retrieved, and distributed.
- A radio script can be adapted for use in different countries and so reach many more people than the initial audience.

Problems

While radio has many advantages, there also are problems:

- Access to radio broadcasting, as to all mass media, is in the hands of "gatekeepers"—government broadcast services, private or government radio stations, or various regulatory bodies—who sometimes restrict references to family planning on the radio (see box, p. J-872).
- Because radio is often present in the background, many listeners pay little attention to it.
- Radio receivers break down and are difficult to get repaired. Batteries are difficult and expensive to obtain in countries that lack battery factories or foreign exchange for imports. In some places economic difficulties have aggravated these problems. In fact, radio ownership may be declining in some countries (63, 127).
- For many, including some family planning managers, radio lacks the glamor of television. Thus some may want to use television even when radio would reach a larger audience or a specific audience more effectively.
- Radio is not well-suited for teaching manual or clinical techniques—although it can update or supplement previous instruction and can teach subjects that require little graphic presentation (see p. J-873).
- In contrast to print material, which can be saved and re-examined, radio cannot be used as a reference.
- Where there are many small radio stations, as in much of Latin America, it may be difficult to reach a large audience through any one station. In some urban areas television may be more efficient than radio for reaching large numbers of people. (At the same time, however, the existence of small radio stations makes it possible to transmit local information to highly specific audiences.)
- Where there are few stations, as in much of Africa, it may be difficult to schedule family planning messages at popular listening times unless the messages are well-produced, creative, and entertaining.
- In some mountainous countries, such as Bolivia, Nepal, and Peru, radio signals do not reach far. This problem is sometimes overcome by use of shortwave radio, which travels farther.
- While the cost per listener of producing and broadcasting radio programs is usually quite low, the absolute cost of good programs can be high. It is easy to underestimate these costs.

Radio reaches more people than any other mass medium. Throughout the world many families have their own radios, while others gather to listen to community radios. The broad reach of radio offers special opportunities for family planning programs. (Maria Teresa Farr, AED)

Radio and Other Communication Channels

Radio is most effective when used in conjunction with other channels of communication (97, 99). Several media are best used together to reinforce each other or to compensate for each other's shortcomings. Different media reach different audiences. The guiding rule is: Use the media that give best access to intended audiences. For example, radio is usually the most effective medium for

Table 1. Number of Radio Transmitters and Receivers, Receivers per 1,000 Population, and Percentage of Households with Receivers, World Regions and Selected Countries, Most Recent Available Estimates, 1978–1985

Region & Country	No. of Radio Transmitters[a] Year	Governmental	Commercial	No. of Radio Receivers, 1985 (in 1,000s)	No. of Radio Receivers per 1,000 Population, 1985	% of Households With Radio Receivers Year	Rural	Urban
AFRICA								
Cameroon	1980	19		1,250	130	1985		89
Ghana	1981	4		3,000	230	1977	46	72
Kenya	1979	22		2,000	110	1983	42	78
Nigeria	1978	111		16,000	160	1983	62	85
Sierra Leone	1982	3		800	210	1985	53	87
Zaire	1983	10		3,000	90	1985		55
Zimbabwe	1985	31		1,000	120			
Regional Total		——700——		52,635	125			
ASIA								
Bangladesh	1979	23		4,000	40	1985		51
China	1985	571		120,000	110	1985	59	79
India	1981	160		50,000	70	1975	38	75
Indonesia				30,000	190		——69——	
Japan	1981	799	209	100,000	830		——95——	
Malaysia	1981	82		3,000	200	1985		91[c]
Pakistan	1983	75		8,900	90	1985	——58[d]——	
Philippines	1981	43	252	7,500	140	1985	——69——	
Thailand				8,000	160	1985		91[e]
Regional Total		——3,440——		381,610	145			
LATIN AMERICA & CARIBBEAN								
Argentina	1979	58	144	20,000	660	1985		92
Brazil	1983	18	1,307	50,000	380	1985		91
Chile	1979	36	73	4,000	340	1985		96
Colombia	1985		352	6,000	210			
Costa Rica	1981	20	103	600	230			
El Salvador	1979	7	68	1,900	370	1985		97
Honduras	1979		153	600	160			
Mexico	1982	34	642	25,000	330			
Peru	1985		298	4,000	210	1985		97
Trinidad & Tobago	1979	2	3	550	480	1985	——94——	
Regional Total		——5,300——		139,121	354			
MIDDLE EAST & NORTH AFRICA								
Egypt	1983	154		15,000	320	1985	——84——	
Jordan	1983	17		900	270			
Morocco	1979	36		5,000	230	1985		99
Tunisia	1979	12		1,350	190	1985		87
Turkey	1983	17		8,000	160	1985	——88——	
Regional Total		——450——		58,075	254			
OCEANIA								
Australia	1981	145	139	20,000	1,290			
Papua New Guinea	1985	——21——		200	60			
Regional Total		——450——		24,673	948			
EUROPE								
France	1981	610		50,000	910	1985	——100——	
Germany, Fed. Rep. of	1983	469		57,000	930	1985	——100——	
Portugal	1981	89		3,500	350	1985	——86——	
United Kingdom	1979	487		60,000	1,090			
Regional Total		——10,240——		462,043	563			
NORTH AMERICA								
Canada	1981	711	515	32,000	1,280	1985	——100——	
United States	1985	1,194	8,593	500,000	2,110			
Regional Total		——11,010——		532,024	2,032			
TOTALS								
Developing Countries		——8,940——		536,724	149			
Developed Countries		——22,650——		1,178,074	945			
World		——31,590——		1,650,181	345			

Source: British Broadcasting Corporation (25), Frost & Sennitt (226), Mytton (127), UNESCO (198)

Note: Transmitter data are from most recent UNESCO estimates (1983) except for 1985 data on transmitters from Frost & Sennitt (226). "Governmental" transmitters include those owned and operated by the government as well as those that receive government support even though they are privately managed.

[a]Includes stations, transmitters, FM translators and boosters, and relay stations used for domestic broadcasts to the general public.

[b]Niamey only

[c]Peninsular Malaysia only

[d]Mostly urban

[e]Central region only

[f]Montevideo only

[g]Doha only

reaching rural areas, while television may be most suitable for reaching urban elites. Any communication project that wants to reach both audiences probably will use both media. Using two media to reinforce each other, health educators in The Gambia chose a combination of radio and widely distributed flyers with color-coded pictograms to teach mothers how to mix oral rehydration solution. The flyers pictured the sequence of steps to follow. But mothers generally were unable to interpret the pictograms until a radio voice led them through the flyer, as if following a recipe (117) (see p. J-875).

Television is a powerful medium with growing influence, but its reach is still limited in most countries. In developing nations television often is available only in urban areas, since TV signals cannot travel as far as radio signals. More areas are gaining access to television, however, and the combination of visual images and sound make its messages convincing. Since wealthy people, including policy-makers and other influential people, are the first to have television sets, the medium is particularly attractive for reaching decision-makers. Television will become more important as new technologies, including communication satellites, microwave relays, and solar generators, expand its reach. Videotapes, a by-product of television, are already being brought to villages to be played in mobile "video-vans" or in community centers. For the near future, however, the relatively high cost of TV production, broadcasting, and receivers is the main impediment to rapid expansion.

Print media have one major advantage over both television and radio: copies can be kept for reference. Newspapers and magazines, like TV, reach decision-makers and other city dwellers. They seldom reach rural areas, however, and are of little use to those who cannot read. Print materials can communicate through illustrations, however. Picture booklets that serve as guides to the use of contraceptives or to breast-feeding are now used in some countries, sometimes in conjunction with radio (150, 151). Simple signs are important everywhere. Billboards tend to be concentrated in cities. Posters, although useful when they tell where to obtain family planning supplies and services, are most used inside health centers.

Films are very popular with the public. Also, they can teach workers skills, such as surgical procedures, that require visual demonstration. Films are expensive to make, however. Showing them requires a power supply, projector, projectionist, and screen, which can be difficult to provide in rural areas (24). Videotapes are being used more and more, where television monitors are available, because they are cheaper to produce and sometimes more convenient.

It has long been recognized that person-to-person communication is a powerful channel of communication, but views of how it works are changing. For years it was generally thought that people learned facts from the mass media but were moved to change their behavior only by people with whom they talked directly—friends, relatives, or community leaders (96). Now the persuasive power of the mass media—partly due just to the great and growing volume of exposure—is increasingly recognized (174). Persuasion is thought to result from complex processes that may involve either mass media or individuals or, usually, a combination of the two (167). For example, in a Honduran community-based family planning project, local distributors visit households, talk to families, and provide supplies. At the same time, local radio announcements about the program give the names of local distributors (89). While a personal contact may be the final, decisive factor in prompting a couple to use family planning, hearing about family planning—and about distributors and various methods—on radio or other mass media can legitimize family planning and add to the status and credibility of the community workers.

Thus the recent trend has been to treat radio and other channels of communication as components of larger systems. These components are no longer perceived as competing but rather as complementary. Furthermore, communication efforts must always work in tandem with service delivery efforts. Both are necessary to a complete family planning program or any other health or development program.

FAMILY PLANNING ON RADIO IN ASIA

Radio is used to promote family planning in many different ways. Radio can help to make the idea of family planning acceptable to people who know little about it and need assurance that it is beneficial and socially approved. Radio can advertise brand-name contraceptives to couples who want to plan their families but need to know what and where to buy. Radio can tell listeners how important birth spacing is to protect the health of mother and children. Radio can tell people the names of community-based distributors of contraceptives in their villages.

There are about 3,400 radio stations in Asia (198), and most households have radio receivers (25). In Asia, with some of the oldest and largest national family planning programs and a broadcast industry that is largely government-operated, radio has been widely used for family planning. Much of this experience has not been well-documented, however. The governments and family planning associations that run communication programs are more interested in results than in research.

All India Radio sponsored a family planning lottery in Kerala State in 1985, open to women who were sterilized. Here a Kerala official presents the prize to the winner. (All India Radio)

A Variety of Formats for Radio on Family Planning

Formats are basic types of programs. Different formats suit different messages, program goals, and audiences. They also differ in requirements for studio equipment and trained personnel (240). Some of the most common formats are:

- **Spot announcements**, which last from 10 seconds to two minutes. They can motivate listeners or convey information in many forms: simple spoken announcements, short dramas, short stories that make a specific point, slogans, and jingles. Each spot should cover just one topic (87, 99)—for example, clinic hours, promotion of a brand-name contraceptive, or the health benefits of child spacing. An advantage of spots is that many short broadcasts in a given period almost always reach more people than one or two longer programs. Producing spots does not necessarily require highly sophisticated equipment or trained personnel, but script writing requires skill and creativity (110). Radio stations will sometimes broadcast spots free as public service announcements (PSAs).
- **News broadcasts**, which range from a single announcer reading wire service reports to an elaborate presentation with live and recorded reports from journalists in the field, interviews with newsmakers, and even commentaries by celebrities. News broadcasters often have high credibility with listeners (20, 87, 99). Obtaining radio news coverage for family planning requires making a newsworthy story easily accessible to broadcasters (see box, p. J-876).
- **Interviews** with doctors and other health experts or with family planning users and potential users. Family planning professionals can organize and record their own interview programs or can be interviewed on programs produced by broadcasters. Interview programs that take questions from a studio audience or, via telephone or letters, from the radio audience are often popular. Interviews can be produced with simple, inexpensive equipment (87).
- **Speeches, lectures, or talks**, delivered by a single speaker—a person in a high position, an educator, or other expert (46). One person reading is not always enough to hold the interest of open-broadcast listeners. Lectures are most suitable for educational radio directed at highly motivated listeners.
- **Panel discussions, round tables, and group discussions**. Several people discuss a topic with the guidance of a moderator or host. The ideal number of participants is three, plus the moderator (87). Discussions can be produced with simple, inexpensive equipment.
- **Drama**, in which fictional events are depicted by actors, usually with sound effects. Serial dramas, or soap operas, are stories that continue from one episode to the next, broadcast on a regular schedule (87). Radio soap operas are popular in many countries and have been used in several countries to promote family planning. They are especially useful for convincingly portraying the personal importance of family planning and for helping listeners to think through family planning decisions. Also, dramas often serve as vehicles for spot announcements (99). Producing dramas usually requires skilled personnel and a sound effects library, but facilities and equipment need not be extensive.
- **Music**. Songs with family planning themes or promoting sexual responsibility can become very popular when promoted on radio (see pp. J-863 and J-870–871). Obtaining the maximum impact from songs requires making and distributing records or tapes—a difficult and expensive process. Songs can be used on a more limited scale, however. For example, in Kiribati, an amateur family planning song contest rewarded winners with a chance to perform their songs on the radio (191).
- **The magazine**, a radio variety program that combines several formats into a single show. These might include short dramas, interviews, news items, commentary, musical selections, and spot announcements. Magazines vary in length from 10 to 45 minutes (87). They may require skilled coordination and fairly elaborate studio equipment.

Other formats, such as debates, quiz shows, documentaries, roving reporter shows, and telephone call-in programs, also can have a place in family planning radio. Indeed, any format can be used effectively for family planning messages when broadcasts are produced by skilled and creative people.

India, South Korea, the Philippines, and Taiwan were among the first to establish strong national population policies. Like other Asian countries, these countries have government-owned radio stations, although South Korea and the Philippines also have privately owned stations. The combination of high policy priority and ease of access to radio led to several experiments in use of radio to promote family planning. Some of these early projects included:

- In the Songdong Gu area of Seoul, South Korea, starting in 1964 several channels of communication, including radio and home visits, were used to tell some 45,000 young women about contraceptive services and where they were available. In a survey of 3,045 women, radio proved to be the single most important source of information, ahead of neighbors, home visits, and group meetings. It also was most popular with the women (136).
- In Taiwan's Kaohsiung City in 1967 a multimedia campaign aimed at increasing use of IUDs and oral contraceptives (30). In a postcampaign survey women most often cited radio as their source of information about family planning. Also, radio got the information to the women at a lower cost per listener than films or other media (194).
- In the Hyderabad District of Pakistan in 1967, 30- and 60-second family planning radio spots were broadcast five times a day. Some 64 percent of women using

family planning clinics reported hearing family planning messages on the radio (83).

- In Gujarat state, India, in the mid-1960s, family planning radio programs reached half of the men and women who listened to radio—and each of them, in turn, passed on the family planning message to an average of six other people (140).
- The Family Planning Organization of the Philippines and the Rural Broadcasters' Council broadcast a daily 15-minute family planning "school on the air" to farmers for three months in the early 1970s. The "school" sessions consisted of talks by doctors and other experts. Before the "school" started, a month of promotional spots broadcast three to five times daily invited listeners to enroll (218).

Radio spots and announcements are the most widely used format because they are easily produced and reach the largest number of people. Contraceptive social marketing programs have broadcast radio spots and other messages to advertise specific products and brand names. Serial dramas, or soap operas, although more difficult to produce, have been popular in several Asian countries.

Social Marketing in Asia

Contraceptive social marketing programs sell brand-name contraceptives at subsidized prices through existing commercial outlets (see **Population Reports**, *Contraceptive Social Marketing: Lessons from Experience*, J-30, July-August 1985). These programs use commercial marketing techniques, including advertising, to promote their products. There are now 20 major social marketing projects underway, with 6 more in the planning stages. For most of these programs, radio is an important promotional medium. In India the *Nirodh* condom project—the first contraceptive social marketing program—has used radio since its start in 1967. Major social marketing programs in Asia that use radio extensively now are in Bangladesh, Indonesia, and Nepal.

Since 1975 the Bangladesh Social Marketing Project has used commercial advertising and distribution channels to sell subsidized condoms, oral contraceptives, and foaming tablets at low prices. A semi-autonomous organization operating under an agreement with the Bangladesh government, the Bangladesh Social Marketing Project receives technical assistance from Population Services International and support from the United States Agency for International Development (US AID). Half of the advertising budget goes to radio, with the other half divided among newspapers, cinema, outdoor, television, and point-of-purchase advertising (105).

Before 1983 virtually all advertising for the social marketing project focused on products. In 1983 motivational advertising was added to break down resistance to family planning among the 81 percent of couples in Bangladesh who were not using contraception. Manoff International, an advertising agency that specializes in social marketing, held focus-group discussions and interviewed people to learn why they were not using contraceptives. Major resistance points turned out to be fear of harmful side effects, lack of knowledge of contraceptive options, religious objections, and failure of husbands and wives to communicate. Male dominance of family life—including a near monopoly by men on listening to the radio and shopping—made it necessary to aim advertising mainly at men (110).

Radio and television spots were designed on the basis of these observations. They dramatized husband-and-wife discussions about contraception in an effort to legitimize such discussions. Attacks on other points of resistance were woven in (105, 110). To prevent the advertising from growing stale, these spots have now been replaced by new ones with new themes (105). Besides spots, the Social Marketing Project produces a radio soap opera, the theme of which is the benefits for family life of practicing family planning. The 15-minute program is broadcast twice weekly (105).

In a 1983 survey 67 percent of respondents said that they had heard at least one Social Marketing Project radio program. Some 83 percent had heard about family planning from radio—more than from television, radio's nearest competitor, at 28 percent, or newspapers, at 12 percent. Almost all respondents thought that the information on the programs was useful. From 80 to 100 percent of respondents correctly understood the messages of the motivational advertising. Urban residents more often understood the messages correctly than semi-urban or rural residents (121).

In Indonesia the National Family Planning Coordinating Board (BKKBN), with technical assistance from Social Marketing for Change (SOMARC), recently launched social marketing sales of DuaLima condoms in the cities of Surabaya, Bandung, and Medan. Advertising is by radio, newspapers, magazines, cinema, television, mail, billboards, posters, and stickers. According to a survey by Survey Research Indonesia, radio and newspapers tied as the largest contributors to product awareness. Consequently, a larger share of the project's advertising budget was devoted to radio in a new phase of the project that began in Jakarta in October 1986. Radio is inexpensive in Indonesia. Thus the shift will increase cost-effectiveness (170, 188). When SOMARC was preparing to launch the campaign in the first three cities, a local popular music group recorded a song about condoms that became popular. Although the music group had no connection with the project, the song boosted the campaign (40).

Soap Opera in Indonesia

Grains of Sand in the Sea is a popular Indonesian radio serial drama that promotes family planning. The show

Radio production students in Nepal practice role playing as they read scripts. Professional actors often play the roles in family planning broadcasts, but family planning workers and satisfied users also can be convincing speakers. (JHU/PCS)

illustrates how commercial and government entities working together can use radio to encourage family planning (145). It began in 1977, jointly sponsored by BKKBN; the government radio network, Radio Republic Indonesia (RRI); and P.T. Richardson-Merrell Indonesia, which markets Vicks products in Indonesia. Richardson-Merrell paid more than half the costs of developing and producing the soap opera and presented three advertisements with each episode of *Grains of Sand* on private radio stations. In 1981 the program was airing on 103 private stations. The government broadcast service produced the program and also aired it on government stations, where Richardson-Merrell received an acknowledgement of sponsorship. Richardson-Merrell has since left the project, which now is managed entirely by BKKBN and RRI. Mobile units carry tapes of the programs to rural areas to play for local audiences. Tapes also are lent to local groups, women's clubs, hospitals, and mosques for playing to members or employees (145).

Grains of Sand portrays the life and work of a cast of regular characters, who include doctors, nurses, health workers, and community members. The announcer describes an episode in an opening synopsis:

> Subagyo and Santi are husband and wife, who, like cat and dog, live endlessly squabbling over their seven children. When the eighth child is conceived, their quarrels worsen, causing Santi almost to perish in a miscarriage. Eventually their life together regains its peace and harmony after they adopt family planning. (146)

The show is 15 minutes long and airs six times a week. Early episodes were translated from English-language scripts written by Filipino writers for a similar series in the Philippines. Now the show is entirely written in Indonesia, and the cast of characters and the basic story line are changed periodically. During at least part of the show's life, a segment following every third episode answered questions mailed in by listeners (146).

No formal evaluation of *Grains of Sand* has been made. Richardson-Merrell maintained support for several years because the company attributed increased sales of Vicks products to the program. The many letters from listeners showed a high level of interest and approval. Formal evaluation is now being discussed (163).

Other Radio Projects

Many other family planning radio programs are underway or planned in Asia. Among them:

- All India Radio, the government network, in collaboration with the United Nations Childrens Fund (UNICEF), produces programs on maternal and child health that include material on child spacing. The programs are unusual in that they are based on research by

Strategies in the Use of Radio

Radio can be used in various ways to support social and economic development. These are referred to as strategies. Any of these strategies—or a combination of them—can be used in family planning and other radio programing for development. Ideally, they function as part of a broad-based communication effort that uses many communication channels, all reinforcing each other. These communication efforts, in turn, must be coordinated with service delivery. Radio strategies fall into three categories:

- open broadcasts,
- listening groups, and
- campaigns (38, 112, 189).

Open broadcasts are for unorganized audiences—whoever tunes in—and include almost all radio programs including family planning broadcasts. They can use many different formats (see box, p. J-858). The cost per listener is lower than with other strategies because no field staff is required. Open broadcasts usually reach the largest audiences, which may cut across age, sex, and other lines. The fact that they can attract so many casual listeners of so many different types is a major advantage.

Open broadcasts have their limitations, however. The most popular and effective formats—serial dramas and music, for instance—require more sophisticated production skills and equipment than other formats. Also, because the audience is dispersed and unorganized, it is difficult to reinforce open broadcasts with face-to-face contact (112).

Listening groups are organized to listen to broadcasts prepared specifically for them—for example, children or adults gathered for formal instruction in schools or other community centers, rural opinion leaders hearing "radio farm forums," or adults gathered informally under the guidance of volunteers to learn literacy or other basic subjects. Listening groups provide opportunities for discussion and face-to-face reinforcement of new information or skills. This helps people learn more easily. The groups also can provide feedback to the originators of the radio programs.

The main disadvantage of listening groups is that they require extensive logistic support—a place to meet, trained leaders, often print materials, and, when there are many listening groups, even large administrative organizations. Most listening groups have been fairly short-lived. It is difficult to keep people attending voluntarily over long periods, a problem that worsens as more people obtain radios and stay home to listen to them. Listening group broadcasts are by definition highly specialized and attract fewer listeners than open broadcasts (79).

Campaigns on radio have a specific, often time-limited objective, such as promoting designated vaccination days. They commonly use public service spot announcements or paid advertisements, which can be broadcast between regular radio programs. This publicity is only one part of a much larger effort that combines communication through many channels and intensive service delivery efforts that mobilize both workers and political support (119). Such campaigns can have impressive short-term results, but some experts worry that they may divert attention and resources from building ongoing service delivery programs (206, 207). This problem can be minimized when campaigns function as phases in longer-term programs, using those programs as a base for periodic intensive efforts.

radio producers in rural villages. Radios are distributed to women in the villages, and listening groups are organized (92).

- The Family Planning Association of Hong Kong uses spots and other formats to broadcast family planning messages on radio (77). Radio programs were major components in multichannel campaigns in the early 1980s to encourage male responsibility in family planning (93) (see **Population Reports**, *Vasectomy—Safe and Simple*, D-4, November-December 1983).
- In Bangladesh the government's Radio Bangladesh produces *Sukhi Sangsar* (*Happy Family*) and broadcasts the show nationwide six days a week. The programs consist of talks, interviews, dramas, music, documentaries, replies to listeners' letters, and other formats—all related to health and family planning (69). In a 1983 survey 86 percent of respondents said that they listened to family planning shows on the radio. About half the respondents recalled the name *Sukhi Sangsar* (129).
- The Philippine Commission on Population has used radio as the major communication support for its family planning programs. Among the formats are soap operas, forums, variety shows, spots, jingles, and "minidramas" (155).
- The Family Planning Association of Sri Lanka recently sponsored a weekly family planning radio program in the Sinhala language. Each 15-minute show consisted of a brief segment dramatizing a particular family planning problem followed by a talk by the medical director of the association (3). The Sri Lanka Association for Voluntary Surgical Contraception also broadcasts a radio program, in Sinhala and Tamil (77).
- The Family Planning Association of Pakistan has used radio spots and dramas to promote family planning (71). Pakistan plans a new contraceptive social marketing project and a mass media communication project, which intend to use radio advertising and other mass media publicity (170).
- Radio Nepal in recent years has had a weekly hour-long family planning radio program (98).
- In Thailand radio is used so extensively to promote family planning that 90 percent of respondents in a 1984 survey reported having heard such broadcasts (77). A 30-minute radio program is broadcast weekly in every region of the country, in local dialects, by the Planned Parenthood Association of Thailand. A 3- to 5-minute radio program is broadcast daily, also in all regions, to increase knowledge about family planning and related topics, including sexually transmitted diseases and family relationships (235).
- In China radio is widely used to promote family planning. For example, a "family planning publicity month" in 1983 used a variety of communication channels, including radio, to explain the relationship between population growth and consumption of natural resources and food. Radio and television programs were broadcast some six million times (179).

FAMILY PLANNING ON RADIO IN LATIN AMERICA AND THE CARIBBEAN

Radio has been enlisted in a number of different ways to promote family planning in Latin America and the Caribbean. Some programs have been long-lived and attracted loyal followings. Others have been shorter-term projects, testing new approaches. Some of these, too, have won large audiences.

The typical radio station in Latin America is a small, low-power operation that reaches a small area. Such stations can broadcast local messages, such as the names of CBD distributors or the addresses of family planning clinics. (JHU/PCS)

The Latin American and Caribbean region has higher concentrations of radio stations and receivers than any other developing region. There are over 5,000 radio stations in the region—about 14 per million people. By comparison, there are about 1.8 stations per million in sub-Saharan Africa and one per million in Asia (198). Similarly, Latin America has about 340,000 radio receivers per million people, and the Caribbean, about 600,000 per million, compared with about 125,000 to 150,000 per million in sub-Saharan Africa and in Asia (25).

Latin American radio stations are a mixture of large and small privately owned stations, government stations, and religious stations. The typical station is a small commercial

Honduras: *Your Local Distributor*

In 1985 radio spots for the Asociación Hondureña de Planificación de Familia (ASHONPLAFA) promoted local community-based distributors by name. Spots such as this were broadcast on low-power stations that reach just the areas within easy reach of the distributor's post.

(Jingle in background.)

Announcer: Attention, inhabitants of the community of San Jeronimo in the province of Copan: The family planning site closest to your house is that of Mrs. María Rodríguez in the El Centro district.

Remember, you can obtain the best medical supplies at the lowest prices for planning your family. Look for them today at the home of Mrs. María Rodríguez, in the El Centro district of San Jeronimo in Copan. Be convinced and don't pay more, because today family planning is everyone's right.

facility with few production resources, limited programing, and a small, local audience (4, 68).

This heterogeneous broadcast industry offers diverse opportunities to promote family planning. Just as volunteer associations have led in developing family planning programs in Latin America, privately owned radio stations may be able to broadcast messages that government-owned stations would be reluctant to air. Also, small stations can provide specific information about local family planning programs, such as names of local distributors and clinic locations and hours of operation.

The Caribbean, too, has a mix of government and privately owned stations. Government stations started first, when these nations were colonies, but many nations began permitting private stations after independence in the 1960s. Government stations have a mandate to promote social and economic development. Many now accept paid commercials, offering private organizations the opportunity to buy air time for their messages. Private stations in most of these countries are required to devote some air time to social and development purposes (108).

Diálogo

A good example of consistent, planned, long-term use of radio to encourage family planning is *Diálogo* in Costa Rica. A nationwide 10-minute radio program, *Diálogo* is produced by the Centro de Orientación Familiar (COF), a private organization that promotes responsible parenthood through sex education. Five national or regional radio stations now carry the show as often as five times a week each.

Diálogo offers "integrated sexual education," including messages about family planning, sexuality, parent-child relations, and divorce. It began in 1970 as an attempt to break down taboos against discussion of sexual issues. Over the years *Diálogo* has used many formats: dialogues between a professor and a laywoman, dialogues between two women, dramatized life stories of women, and others (89). A key feature of *Diálogo* is that it answers letters from listeners—on the air, in a newspaper column, and in personal replies by mail. Letters received sometimes suggest the themes for radio programs (164, 189).

The program was intended at first to reach lower-class women, and it has succeeded. A 1978 survey showed that *Diálogo* reached poor people—female and male, urban and rural—to an extent unusual in development communication efforts. The poor made up 80 percent of the audience, just as they made up 80 percent of the population. Many listeners were men. Indeed, *Diálogo* reaches a large part of Costa Rican society. Some 36 percent of the nation's adults were regular listeners in 1978 (164). An evaluation by Stanford University at that time also showed that regular *Diálogo* listeners at all social levels had better knowledge of and attitudes toward family planning than nonlisteners and also were more likely to practice family planning (164).

In 1984 and 1985, with the help of Population Communication Services at the Johns Hopkins University, *Diálogo* underwent a 15-month review and upgrading of content and technical quality. Family planning and the role of women in development were emphasized. Listeners were increasingly involved in various ways. For instance, women and women's groups were asked to monitor the program and give their opinions. Letters from listeners increased from 30 to 50 a week. The number of national and regional stations broadcasting *Diálogo* increased from three to five (29).

2 Ahuaico

Diálogo Abierto
Diálogo abierto ofrece respuestas profesionales, serias y francas a las consultas de nuestros lectores.
Este espacio está a cargo de los profesionales del Centro de Orientación Familiar, personas de mucha experiencia en el campo de la educación sexual y vida familiar.
Escríbanos enviando su pregunta a: DIALOGO ABIERTO -Apartado 6808 San José

ESTERILIZACION FEMENINA

P/ ¿Qué tipo de complicaciones médicas pueden surgir a raíz de la esterilización femenina? ¿Puede la operación fracasar?

R/ Cualquier intervención quirúrgica que no se realice bajo condiciones higiénicas puede conducir a una infección. Si la mujer se somete a la operación en un hospital de buena reputación, bajo el cuidado de un médico calificado, el riesgo de una infección debería ser mínimo. En caso de que se desarrolle una infección (inflamación, hinchazón, dolor, secreción provenientes de la incisión), la mujer debe ver al médico inmediatamente para someterse a un tratamiento.

Complicaciones de mayor gravedad son extremadamente excepcionales.

Algunos que son pocos, cuando las trompas no han sido cerradas debidamente o cuando se juntan de nuevo y vuelven a abrir el canal, la mujer puede recuperar su fertilidad. Sin embargo, esto ocurre tan raramente que no se necesita pensar en ello seriamente.

VIRGINIDAD

P/ Tengo una novia con la que pensaba casarme, pero me decepcioné al saber que no estaba señorita. Ella me aseguró que jamás había estado con otros hombres, que el primero fui yo. Quiero que me expliquen sobre esto, porque yo aún la quiero.

R/ Es falso que todas las mujeres deben sangrar o experimentar dolor durante su primera relación sexual. No sabemos en que se basó usted para creer que ella tuvo relaciones pero la verdad es que no hay formas seguras para que el hombre se de cuenta de esto. Muchos hombres han cometido serios errores pensando que su compañera no "era señorita", sólo porque ella no sangró o porque la introducción no resultó difícil.

Si la mujer no está tensa, si está excitada y bien preparada y si su himen es una membrana delgada o de abertura amplia, la desfloración no tiene por qué resultarle molesta. No se deje llevar por falsas creencias. En este caso, el único dato confiable es lo que diga su novia y la confianza que usted puede tener en ella.

Radio is more effective when used with other communication channels. In Costa Rica the newspaper column *"Diálogo Abierto"* ("Open Dialogue") answers readers' questions that are sent in response to the popular radio program *Diálogo*.

To help support the show, COF sells booklets on such subjects as the condom, female sexuality, Natural Family Planning, and sharing household tasks. COF also has sold tape cassettes of radio shows. COF depends partly on donors, including local groups and the United States Agency for International Development (US AID) (29, 148).

According to the Stanford researchers, one reason for the popularity and effectiveness of *Diálogo* is that it helps listeners to consider their own sexuality in relation to other issues, such as child-rearing, divorce, and unemployment. Another is its response to listeners' letters. As the researchers noted, this has created two-way communication unusual among family planning radio projects (164).

Evaluation in 1985 showed continuing impact: listeners proved to be much more knowledgeable about family planning than nonlisteners (89). In 1986 the program won a national broadcasting prize.

Songs and Soap Opera in Jamaica

In Jamaica radio is a primary medium in two family planning communication projects, one conducted by the government's National Family Planning Board and the other by the Jamaica Family Planning Association. The government project, developed by the Jamaica office of the interna-

tional advertising agency McCann-Erickson, has used songs, radio and television commercials, and newspaper, billboard, and cinema advertisements. They emphasize the advantages of small families and the disadvantages of early pregnancy. The Family Planning Association project is a radio serial drama, or soap opera, called *Naseberry Street*. It depicts the lives of employees and clients of a family planning clinic.

The government project has been conducted in two phases. The first phase (1982–84) used the slogan "Two is better than too many." The slogan was repeated in radio advertisements and other ads. These ads featured two characters—Judy Smith, who was poor because she had four children to raise, and Bev Brown, who was portrayed as better off because she had only two children. The two characters are now well-known to Jamaicans (169).

The second phase (1985–86) featured a pregnant schoolgirl facing a bleak future. The slogans of this phase were "Before you be a mother, you got to be a woman" and "Before you be a father, be a man." The first slogan is the chorus of a song, sung to a reggae beat, that was the centerpiece of this phase of the campaign (130) (see **Population Reports**, *Youth in the 1980s: Social and Health Concerns*, M-9, November-December 1985). The song was written especially for the National Family Planning Board. It was introduced in 1985 by a well-known disc jockey and performed by Gem Myers and the Fab Five, a popular group in Jamaica. It was still being played by radio disc jockeys in late 1986. The theme is that young girls who are sexually active risk getting pregnant and facing serious problems:

> I had to drop out of school.
> Now I can't get a job.
> I have no education, and I have no man.
> So, young girls, get wise, have fun while you can.
> Children can wait until you become a woman.

Besides the song, this phase of the campaign included spots on radio and television with the same theme, a young girl alone and friendless after she became pregnant (169). The National Family Planning Board obtained free time or concessionary rates for its broadcasts from both the government's Jamaica Broadcasting Corporation and the private Radio Jamaica Limited (160).

With nearly one radio for every two Jamaicans (198), messages reach many people. A 1984 evaluation found that 94 percent of respondents were familiar with the government project's 2-child message. In a 1986 evaluation about 90 percent recalled the early pregnancy message. Rates of recall were high at every socioeconomic level. Between 1982, when the government project began, and 1984, visits to Ministry of Health family planning clinics rose from under 80,000 a year to more than 130,000 a year (27, 169).

Naseberry Street

The radio soap opera *Naseberry Street* was launched by the Jamaica Family Planning Association in February 1985. The 15-minute show is aired at 9:15 a.m.—prime time in Jamaica—on Mondays, Wednesdays, and Fridays. A well-known Jamaican scriptwriter, Elaine Perkins, writes the scripts. Currently, US AID supports *Naseberry Street*, but a private sponsor is being sought.

Naseberry Street communicates a variety of family planning messages by depicting the lives of characters associated with the fictional family planning clinic. Among the characters is Scattershot, a strutting male who lives up to his name. Another is Bethune, Scattershot's woman, who finally throws him out after having three children. Another woman, Nana, is fatalistic about having more children than she wants. And so on. These characters are as well known as Judy Smith and Bev Brown, the fictional mothers in the government campaign. Observers report that *Naseberry Street* is well-written, well-produced, and of excellent technical quality (43, 169).

In a 1985 survey more than 75 percent of 2,000 respondents reported listening to *Naseberry Street*, many on a regular basis. More women than men were listeners. Poor people were more likely to be regular listeners than middle-class people. Listeners were more likely than nonlisteners to use contraceptives, although of course the difference may not result from the program. Both men and women reported that their view of family planning improved because of the program, but women said so more often than men. Among the urban middle class, for example, 42 percent of young women and 34 percent of young men said that their views had changed. Also, more women than men reported learning from the program. Among the

Mexico:
Husbands Change

The Federación Mexicana de Asociaciones Privadas de Planificación Familiar (FEMAP) in 1985 mounted a radio and print campaign to support community-based distribution efforts. These excerpts from a short radio drama portray a conversation between Consuelo, a family planning community worker, and her neighbor Tonita.

Tonita: So, Consuelo, how's Juanita?

Consuelo: You wouldn't believe how happy she is, her husband has changed so much! You know, he didn't used to let her take the pill, but now he's agreed to it.

Tonita: How did Juanita manage to change his mind?

Consuelo: Well, Juanita said that one day her husband came home, and they started talking about the kids, and they decided it would be best for them to make sure not to have too large a family.

Tonita: Well, that's really news!

Consuelo: Would you believe how men are changing? They don't want their wives to have too much work, and it's true that it's very hard for their wives to take care of so many children all alone.

Tonita: I can't argue with that! Money doesn't stretch very far any more. No doubt it's better to think about it . . . .

* * *

Consuelo: Now you know, Tonita, that we community workers are here to serve you with everything that family planning has to offer.

Announcer: Ladies, planning your family does have advantages. Think about it!

lessons: birth control should be used to avoid unwanted pregnancies; young people should put off having sexual relations; and men need to behave more responsibly in sexual matters. About half of all listeners discuss the program with friends and relatives. Ironically, some 34 percent of male respondents chose Scattershot as their favorite character, although 35 percent chose him as the character they most disliked. (Of course, the men who chose him as their favorite character may not approve of his behavior.) Only 16 percent of women chose Scattershot as their favorite (185).

The National Family Planning Board has recently begun a call-in program, which airs immediately after *Naseberry Street* on Wednesday mornings. It is supported in part by a private business group. The program answers listeners' questions about family planning (27, 67). Thus the private Family Planning Association and the government work together to maximize the impact of their radio shows.

Radio Spots in Colombia

Two special family planning radio campaigns have been carried out in Colombia—one over a decade ago, promoting family planning services, and the other recently, promoting condoms. Both were carefully studied to measure their impact. Pro-Bienestar de la Familia Colombiana (PROFAMILIA), the private family planning association, sponsored both efforts.

The first consisted of campaigns for several months each year in 1969–72 and 1974. The campaigns involved intensive broadcasting of radio spots designed to increase the knowledge and legitimacy of family planning and to bring new clients to PROFAMILIA clinics (11, 12). A Bogotá advertising agency donated management and production services. The 15- and 30-second spot announcements were broadcast several times during the day and early evening in 14 cities and on many radio stations. The spots pointed out the benefits of having only the number of children that a family could reasonably care for. Each ended with the name and address of a PROFAMILIA clinic. Messages were aimed mainly at women. The rationale was that many women did not want more children but did not know where to find family planning services. Specific contraceptive methods were not mentioned in the broadcasts. There was no pre-testing of messages (12).

By presenting simple information on clinic hours and locations, the radio spots brought many new clients to family planning clinics. It is estimated that 6,050 women came to the clinics in response to the radio announcements of the 1971 campaign, for instance. This is about 18 percent more than the number that came in response to all other promotions. In general, the campaigns were more effective in attracting new clients in large cities than in small and medium-sized towns (12).

The campaigns also may have increased the legitimacy of family planning in Colombia: People became more willing to discuss family planning openly. According to a 1973 survey by Interamerican Research, 45 percent of 3,594 randomly selected men and women had first heard about family planning on the radio, and 24 percent could recall some part of the PROFAMILIA radio messages. A new government population policy became possible perhaps in part because of greater openness about family planning following the radio campaigns (11, 12, 186).

Legitimizing Condoms in Colombia

In 1984 and 1985 a generic condom promotion campaign in Colombia used radio to improve the image of condoms, which were associated in many minds with prostitution. The campaign was conducted in Cali, Colombia's third largest city, and sponsored by PROFAMILIA with the help of the Futures Group and Johns Hopkins University Population Communication Services. Radio advertising was developed and produced by Toro Publicidad, a Colombian advertising agency, which also conducted research before and after the campaign. Seven radio stations aired the spots 10 times a day from Monday through Friday for five months. Five spots were used, all of them aimed at men. In all, they were broadcast 3,300 times (152).

Of the five spots, the one best remembered portrayed a scene in a drugstore (208). The male druggist and a male customer discuss condoms in the presence of a female clerk. She hands the druggist a box of condoms for the customer after the customer says, "I came to buy some condoms. What you achieve in life must be protected. That's why I'm careful."

After the customer leaves, the clerk asks the druggist: "That's a man of character, isn't that right, Victor?"

"Yes, Miss," he replies.

"It's true, to love with responsibility is also a man's concern," says an announcer. Then he ends the spot with the announcement, "This is a message from PROFAMILIA." No condom brand name was mentioned in the spots.

The campaign appeared to improve the image of condoms, according to panel surveys:

Statement	% Agreeing	
	Before Campaign	After Campaign
Using condoms is responsible	80	88
Men have a responsibility for family planning	9	19
Use condom currently	34	39
Condom has a bad image	78	45
Dissatisfied using condom	63	42
Embarrassed to use condom	53	31
Shouldn't bring condom home to use with permanent partner	71	52
Condom is unpleasant	72	48

Source: Population Communication Services (152), De Bucheli (45), Worstell & Lucaire (208)

The campaign also broke new ground in the policy arena. For two weeks early in the campaign, the Ministry of Information prohibited the advertisements because officials thought that they would offend the public. But the Ministry reversed itself and approved the ad when PROFAMILIA presented the results of precampaign research showing that the word "condom" and advertising for condoms did not offend most people (152). A further indication that the ads were welcome was a column in Colombia's largest newspaper that applauded the campaign (236).

The campaign could not demonstrate increased sales of PROFAMILIA brand condoms, however. Perhaps this was because, as the campaign began, large supplies of contraband condoms arrived in the country, and other condom manufacturers began to sell their products in Cali (42, 208). These events suggest increased demand for condoms, which may have come in response to the radio campaign.

Other Radio Projects

Radio has supported family planning in various other ways in Latin America and the Caribbean:

- Songs that encourage young people to put off starting sexual activity have won wide popularity on radio in a number of Latin American countries (see pp. J-870–871).
- Most contraceptive social marketing programs in Latin America and the Caribbean use radio in conjunction with other media to advertise oral contraceptives, condoms, and other contraceptives. These include programs in El Salvador, Guatemala, Honduras, Jamaica, Mexico, Peru, and in Barbados, St. Vincent, and St. Lucia (181).
- In Brazil the Sociedade Civil Bem-Estar Familiar No Brasil (BEMFAM) in 1986 started a weekly family planning radio program in the state of Paraíba, assisted by Family Planning International Assistance (FPIA). Since 1976 BEMFAM has produced family planning radio programs in several other states, including Rio de Janeiro, Piauí, Rio Grande do Norte, Pernambuco, and Alagoas. The 20-minute magazine programs include interviews, dramas, testimonials, and regional songs related to family planning. Some of the new Paraíba programs will be reproductions of programs used elsewhere (55).
- In Porto Alegre, Brazil, the Associação Brasileira Proteção Familiar (PROFAM) started a year-long project in August 1986 that will provide family planning information and supplies door to door to about 4,260 clients and in a clinic to about 2,700 clients. The project is promoted through twice-daily announcements on Radio Farroupilha, a "talk station" in Porto Alegre. Once a week the station's most popular announcer reads material on a particular family planning theme that has been prepared for him by the director of the PROFAM project. Two days later the project director and the announcer discuss the theme on the air. The radio station also operates a call-in service that can refer callers for family planning services. The project is assisted by FPIA (219).
- In Honduras radio spots were used to promote community-based distribution of contraceptives, including mention of distributors by name. They appear to have helped sustain contraceptive use, but formal evaluation is not yet complete (90).
- In Chiclayo, Peru, radio spots on family planning and clinic services are broadcast by local radio stations both as free public service announcements and as paid advertisements. The spots are sponsored by the Asociación Marcelino as part of a project to provide community-based services in Chiclayo and nearby cooperatives and villages as well as to provide clinic services. The project is assisted by FPIA (220).
- The Ministry of Health in Mexico, the Futures Group, and CONASUPO, a government-owned chain of grocery stores, launched a new brand of condoms in 1986. The new brand, *Protektor*, is sold in CONASUPO stores throughout Mexico. Initial promotion included three weeks of radio advertising beginning June 9, 1986, in conjunction with the World Cup soccer matches in Mexico. In radio advertisements consumers were quizzed about romantic attachments of World Cup players. This was tied to *Protektor* by identifying the condom brand as "the contraceptive . . . for champions" (239).
- In the Dominican Republic in the 1970s the Dominican Family Planning Association set up a Radio School for Family Education, which broadcast five days a week. The purpose was to reach rural residents who lacked other sources of family planning information. Radio programs covered a variety of family life topics including family planning. The project also involved *promotoras populares*, who supervised contraceptive distribution in the villages and went from house to house encouraging women to visit family planning clinics. Posters, leaflets, and calendars also were used (217).

Panel discussions give family planning experts the opportunity to present information on radio, as in this program arranged by the Zimbabwe National Family Planning Council. (ZNFPC)

FAMILY PLANNING ON RADIO IN AFRICA

Government-supported family planning programs are just beginning in many sub-Saharan countries. Therefore use of the government-owned media, such as radio or television, to promote family planning also is just beginning. Zimbabwe, with a strong national family planning program and the highest levels of contraceptive use in Africa (104), is also the most advanced in use of radio to discuss family planning.

In all Africa there are no more than 1,000 radio stations, many of them low-powered and designed only to relay programs from larger stations (68, 198). Most stations are government-owned or controlled. The entire continent has only a handful of privately operated commercial or religious stations (126).

Africa also has relatively few radio receivers. The continent has only 4 percent of the world's radio receivers but 11 percent of its population (126). The number of receivers is increasing fast, however. A 1976 estimate for *all* of Africa put the number at 31 million (197). An estimate for 1984—only eight years later—for sub-Saharan Africa alone was 50 million (25, 126). These estimates err on the low side because they are based on radios for which government license fees have been paid. They do not count smuggled radios.

Most African broadcast systems have a mandate to promote social, economic, and educational development, and radio is often used for education. Cameroon, Kenya, Mauritius, Nigeria, Senegal, Tanzania, and others have used radio for various instructional purposes. Radio in Africa tends to give great prominence to the speeches of national leaders and to political messages. African radio stations also often broadcast materials in tribal languages,

such as traditional music and stories and advice from respected elders (126).

Often Africa's centralized radio stations do not reach rural majorities. Weak transmitters and rugged terrain combine to make it difficult to serve remote areas (122). Despite the difficulties, radio is Africa's most pervasive mass medium. Thus its potential for promoting family planning is great.

A Variety of Formats in Zimbabwe

Zimbabwe uses radio extensively to promote family planning. The Zimbabwe National Family Planning Council (ZNFPC), a quasi-governmental organization under the Ministry of Health, produces radio shows as part of a multimedia effort in which radio plays the prime role. One of ZNFPC's original purposes was to change traditional values that favor high fertility. Another initial goal was to break down fears that family planning was part of a colonial design to limit the African population. As family planning becomes more accepted, other goals are being added. One is to assuage pointless fears. Some husbands think, for instance, that, if their wives use oral contraceptives, they may be unfaithful—especially if they continue taking pills when husbands are away from home (84).

Radio is Zimbabwe's most important mass medium because many people own radios. Moreover, radio is important for reaching nonliterate people. Zimbabwe Broadcasting Corporation (ZBC), a unit of the Ministry of Information, broadcasts on four channels, all of which include family planning information. Broadcasts are in a variety of languages. The Zimbabwe Reproductive Health Survey in 1984 showed that 56 percent of ever-in-union Zimbabwean women had heard radio programs that referred to family planning (210).

Radio Two, the general purpose channel, broadcasts two 15-minute family planning programs weekly in the Shona and Ndebele languages. ZNFPC plans the programs, produces them with ZBC help, and pays ZBC for air time. Formats are primarily interviews and discussions. ZNFPC staff members, including provincial managers, often organize panels for programs, which sometimes are produced in the provinces. Elected officials often appear on programs because ZNFPC thinks that they will be trusted when they say that family planning is not an effort to limit the African population. Clinic staff often explain contraceptive methods. Letters from readers are encouraged and often are answered on the air. They also are helpful in identifying audience needs (84).

ZNFPC has produced four family planning songs in both the Ndebele and Shona languages. Two of them stress male responsibility, a major new emphasis. The songs are played on the interview and panel shows. A soap opera, also with male responsibility as a theme, is being produced and pilot tested.

Radio Three, the English-language channel for young people, broadcasts a ZNFPC program, "Tomorrow's People," mainly for youth still in school. Many topics are covered, including schoolgirl pregnancies, male responsibility, and sexually transmitted diseases. News programs and documentaries on Radio Two often cover ZNFPC activities. Radio Four, the educational channel, broadcasts two vernacular programs for ZNFPC. Radio Four produces live programs in villages using mobile broadcast units. ZNFPC has participated in one such program and has been asked to participate in future ones. ZNFPC officials have been interviewed from time to time on the English-language Radio One (84).

URTNA

The Union of National Radio and Television Organizations of Africa (in French, Union des Radiodiffusions et Télévisions Nationales d'Afrique—URTNA) is beginning to encourage and help African broadcasters develop more and better family planning and health-related broadcast programs.

In a 1984 survey of URTNA member organizations, 12 of 16 respondents said that they were ready to start family planning programing. Most have regular radio programs that sometimes mention family planning along with a broader range of topics including, for example, maternal and child health and breast-feeding. Two countries—Tunisia and Zimbabwe—already have regularly scheduled family planning radio programs. All countries responding were interested in meeting with health officials to learn more about family health and birth spacing. None reported opposition in any country to broadcasting spots or programs on birth spacing. Interviews are the most common format for health and family planning programs by the URTNA members, mainly because they cost so little to produce. According to the survey, however, music and dramas are most popular with audiences (138).

URTNA has sponsored two workshops, one in 1984 for Anglophone Africa in Nairobi, Kenya, and one in 1985 for

Nigeria: *Success in School*

When the state Ministry of Health launched a family planning program in Ogun state, Nigeria, in 1985, this radio spot was broadcast in the Yoruba language.

Announcer (laughs): Listen to this student's name. She is the first in the class of veterinary doctors. She is Ope-olu Idowe.

Everyone present (cheering): Congratulations to you [her parents] for Ope's success.

Parents: Thank you, thank you. May we all have such successes.

Woman: Listen, Ope's Mum, where is Wale, Ope's older brother?

Ope's Mother: Ah, it has been three years since he graduated from his school of agriculture, and now he has a farm of his own where he keeps animals.

Woman: Don't you know you are very lucky!? You have four children, two of whom have graduated from the university. We got married in the same year. I have eight children, and none of them has been successful in school. You are very lucky. So one does not have to have many children to be considered a successful person.

Commentator: In this modern world it is possible to have few children. Let your wife rest for some time before she has another child. Your future will be enjoyable because too many children creates a lot of burden.

Professional broadcasters record radio programs for the series *Your Healthy Family*, supported by Voice of America. Scripts were written with the help of African doctors and cover such subjects as family planning, prenatal care, and infant care. (VOA)

Francophone Africa in Dakar, Senegal. Johns Hopkins University Population Communication Services helped organize the workshops. They brought together high-level African broadcasters and family planning experts to develop family planning material for radio and television and to arrange for sharing of radio and television tapes. URTNA makes small grants to radio and TV producers and broadcasters to produce new family planning materials. It also publishes a bulletin for broadcasters in French and English. Included in the bulletin are scripts for family planning radio spots, short news items, tales, and short dramas (138, 147). URTNA also operates a Program Exchange Center in Nairobi (see box, p. J-881).

Other Radio Projects

A number of other radio projects dealing with family planning are underway or planned in Africa:

- In Zambia the United Nations Economic, Social, and Cultural Organization (UNESCO) and the United Nations Fund for Population Activities (UNFPA) are helping to train radio personnel in population communication. Also, weekly radio dramas on family planning are broadcast by the Makeni Ecumenical Center in Zambia (56).
- In Lesotho the Planned Parenthood Association and the Ministry of Information and Broadcasting have begun twice-weekly development broadcasts that sometimes cover family planning (81).
- In Mauritius the Family Planning Association, assisted by the International Planned Parenthood Federation (IPPF) and UNESCO, broadcasts 20-minute weekly programs in two local languages, Creole and Bhojpuri (134). The association also promotes family planning on the island of Rodrigues, a dependency of Mauritius, through a biweekly radio program. This program is assisted by FPIA (57).
- In Nigeria a contraceptive social marketing project, managed by Sterling Products Ltd. with contraceptives provided through FPIA, advertises condoms and oral contraceptives on radio and television and in newspapers. In another project, this one assisted by Johns Hopkins University Population Communication Services, radio spots promoting family planning in Nigeria's Kwara and Anambra states appear to have brought many new clients to family planning clinics (162, 232). In Ogun state "talking drums" advertise contraceptives on radio and television. The drum language is widely understood in the area. The drum messages are followed by jingles advertising the same contraceptives. Both tell listeners that *Gold Circle* condoms and *Confident* foaming tablets are reliable contraceptives. The "talking drum" messages are part of a project in which traditional market women sell contraceptives along with more conventional wares such as soap and cosmetics. The project is funded by the Population Crisis Committee and managed by Population Services International (105).
- Working as a volunteer, Babatunde Roland May, a journalist in Sierra Leone, prepared radio broadcast materials for the Planned Parenthood Association of Sierra Leone. They were broadcast in 1983 as part of his Sunday magazine program for youth. They included interviews dealing with adolescent sexuality as well as shorter pieces. One such piece warned parents of the danger of not communicating about sex with adolescent children. Another was a 60-second dramatization of a scene between a pregnant adolescent girl and a boy who denies responsibility for the pregnancy. The scene ends with the girl asking, "What am I going to do now?" Informal surveys indicated that young people welcomed information on contraception presented in the programs but that older people worried that the information could lead to promiscuity (233).
- A new contraceptive social marketing project in Ghana, assisted by the Futures Group, began sales in June 1986. Radio advertising is being used (114).
- The Family Life Association of Swaziland produces weekly radio broadcasts on family life education (58).
- In Burkina Faso family planning slogans, speeches, and songs were broadcast on radio in an intensive 7-day family planning campaign in September 1986. The multi-channel campaign also involved television, newspapers, banners, and other media (94). The Burkina Midwives Association plans radio spots on family planning (54).
- The government-owned Voice of Kenya plans a series of family planning programs in various formats and is especially interested in serial dramas. Also in Kenya the National Council for Population and Development, with help from UNESCO and UNFPA, is developing an integrated mass media campaign, which is planned to include half-hour radio programs and spot advertisements (81).
- Officials of the Family Guidance Association of Ethiopia gave radio and television interviews and lectured on a number of family planning and population issues in 1985 and 1986. Topics included methods of contraception, family planning as it affects youth, and population issues (212).
- The Family Planning Association of Uganda in 1986 secured air time for a 30-minute weekly radio program (203).
- In Niger volunteers tape interviews with villagers, asking their views on various development topics. Radio producers then create programs using the interviews. The volunteers organize listening groups—called "Radio Clubs"—to listen to the programs and provide feedback. Later programs, called "Crossroads" programs, are based on the earlier shows and feedback. Themes have included aspects of health, civics, and agriculture. Discussions are under way about covering family planning as well (175).

FAMILY PLANNING ON RADIO IN THE NEAR EAST AND NORTH AFRICA

Use of radio to promote family planning has been limited in the Near East. Even in Tunisia and Morocco, where there are active government family planning programs, broadcast media have not been used extensively to publicize family planning. An early pilot project in Iran and mass media programs in Egypt are the major examples of radio used to promote family planning.

Virtually all 450 radio stations in the region are government-owned or controlled. Management is either through a government ministry or through a public corporation. In Lebanon some private stations are permitted in addition to the government system (85).

With a large majority of households in the region owning radios—as high as 99 percent in urban Morocco, for instance (25)—the potential for family planning radio is excellent. The main barriers have been government policies that give low priority to family planning or government reluctance to use radio in support of family planning programs. In some countries, however—especially in cities—new technologies are beginning to shoulder radio aside. Television is popular wherever it is available, and in parts of North Africa video houses and video-vans are building a new market based on recorded videotapes.

Isfahan Pilot Project

Radio was the primary medium in a pilot communication project conducted in Iran's Isfahan province in 1970–71. One of the first research-oriented family planning communication projects, the Isfahan Communication Project sought to tell couples about family planning, to increase contraceptive use, and to evaluate audience impact. The project showed that mass media could transmit family planning messages very well and increase contraceptive use, at least in the short term. The Iranian government, the Population Council, the Isfahan Health Department, and US AID developed the project.

The campaign was conducted in two 3-month phases. The first used radio only. The second used radio along with newspapers, mailings, banners, and slides in cinema houses. Government radio stations furnished free air time. Various radio formats were used—spot announcements, dramas, discussions, news items, interviews, and talks. Also, script writers inserted family planning materials into weekly programs for special audiences such as farmers and soldiers.

During the two campaigns one-minute radio spots were broadcast three times a day, and longer programs were aired weekly. The spots described the advantages of the 2- or 3-child family and the pros and cons of contraceptives. They also provided a telephone number so listeners could call an operator who offered further information and mailed leaflets to callers.

The Isfahan Communication Project was one of the first to pre-test its material extensively. Ten radio spots were played to 119 people, who were asked to state their preferences. Respondents liked balanced messages listing good and bad effects of contraceptives better than those listing only good effects. But they also needed reassurance that oral contraceptives and IUDs were indeed safe, because they had heard reports that they were not (100).

The short-term impact of the project was impressive. Familiarity with at least one contraceptive method increased from 77 percent of respondents in a precampaign survey to 89 percent in a postcampaign survey. Clinic reports showed that the average number of new users of oral contraceptives increased from 1,223 per month before the campaign to 1,967 per month after; new IUD users, from 69 per month before to 85 per month after; and new condom users, from 670 per month before to 1,184 per month after (100). The total numbers of new users of contraceptives increased by 18 percent during the radio-only phase of the campaign and by 54 percent during the multimedia phase. Radio was the most important source of family planning information for 26 percent of new clients at clinics during the first phase and for 39 percent during the second phase. There was no long-term follow-up to determine whether increases in contraceptive use were sustained (100), and lack of strong grass-roots or national support made the project short-lived.

Egyptian Radio Encourages Family Planning

In Egypt at least three projects have put family planning on the radio. The State Information Service (SIS) has conducted a communication project on family planning since 1979 using radio, television, newspapers, billboards, and face-to-face contacts. Family of the Future, a contraceptive social marketing project, uses a variety of media, including radio, to sell contraceptives. And the Ministry of Health uses radio for public education on maternal and child health and family planning.

SIS's initial goal was to increase knowledge of family planning. Because that goal has been reached in most areas, the agency has begun to promote the practice of family planning. Its messages stress health issues: the harm to health of early, late, or repeated pregnancies; the benefits of child spacing; the greater likelihood of birth defects with later pregnancies. Verses from the Koran and the Bible that support family planning have been stressed, especially in broadcasts to rural areas.

A new theme is the need for sustained and more effective use of contraceptives. Messages now try to address myths and mistaken impressions. For example, some women mistakenly think that oral contraceptives work by killing sperm, and therefore they take them only on days when they have sexual relations (102, 157). Broadcasts stress the need for "correct" use of contraceptives but leave the description of correct use to pharmacists and other dispensers who meet users face-to-face (102).

SIS family planning materials are frequently broadcast and widely heard, say SIS officials. In 1986 Egypt's four radio networks have together devoted over an average of one hour a day to family planning messages. It is estimated that, if all of Egypt's 50 million people listened to radio, each would hear family planning messages an average of five times each month (49, 157).

SIS has done little systematic audience research or pretesting of radio messages in recent years. Audience research is planned for 1987. SIS officials stay in touch with their audience through seminars that SIS local offices hold in smaller towns for social workers, nurses, midwives,

other health workers, and local religious leaders. Journalists from radio, television, and newspapers attend these seminars and report on them. Village health workers, usually women who are natives of the villages where they work, bring questions from villagers (49, 51, 102, 157).

A 1983 evaluation, carried out by the University of Chicago, showed that the SIS project increased knowledge of family planning but did not necessarily increase use of contraception, especially among the urban and rural poor and in upper (southern) Egypt. While awareness of family planning was widespread, detailed knowledge of contraceptive methods was not. Also, false or exaggerated rumors about the harm of contraceptives were rife (19). Surveys show a significant decline—from about 77 percent with knowledge of some modern method of family planning in 1980 to about 60 percent in 1984—in rural upper Egypt (50, 171, 204). In response, SIS reports that it is now working harder to reach rural people, especially in upper Egypt (157).

Family of the Future, the Egyptian contraceptive social marketing program, uses a variety of media to promote sales of specific contraceptives, including IUDs, oral contraceptives, condoms, and foaming tablets. Because most of its market is in urban areas, where television is more popular than radio, Family of the Future devotes far more of its advertising budget to television than to radio (107, 181). Marketing has begun in rural areas, however, and use of radio can be expected to increase. Family of the Future presents two kinds of messages: (1) brand advertising and promotion and (2) instruction for doctors and pharmacists in the correct use of the products (52). A prime goal of Family of the Future advertising has been to dispel false rumors about contraceptives (53, 181).

The Egyptian Ministry of Health has recently begun to use mass media, especially radio, for public education on maternal and child health and family planning. A radio doctor show answered mailed-in audience questions on these topics, and a soap opera was broadcast during prime time in central and lower Egypt. Well-known script writers and radio voices are used (202).

In Egypt a religious leader expresses his support for family planning. His speech was taped for broadcast on Radio Cairo. Statements by important people can make good radio messages to encourage family planning. (Courtesy of Michèle Lioy, AED)

Other Radio Projects

Aside from the several Egyptian efforts, current use of radio for family planning is limited in the Near East and North Africa. The Family Planning Association in Morocco has promoted family planning through radio, as well as other media, since 1982 (124). In Tunisia there has been some promotion of family planning by radio in both French and Arabic, but not to an extent commensurate with service delivery efforts in the strong national family planning program (94).

The Arab States Broadcasting Union, in cooperation with UNESCO, has produced several radio programs on population and family planning in collaboration with various radio organizations in Arab nations. These include programs on the socioeconomic effects of large families, on polygamy, on population growth problems in Arab nations, and on family planning and use of natural resources (109).

RADIO IN AGRICULTURE, EDUCATION, AND HEALTH

Radio has been used to promote development programs in such other fields as agriculture, education, health, and nutrition. Not all the pioneering radio projects have been effective. Lack of time, money, training, or equipment—or of research, planning, and evaluation—have handicapped some efforts (113, 149). But radio has proved itself effective for certain tasks and audiences—if it is used in the right combination with other media, and if the message is well-designed, tested, and presented.

Agriculture

One of the first and still most widespread uses of radio for social development is in agriculture. As early as the 1930s, government-sponsored open broadcasts in the United States and Canada gave farmers information about market conditions and improved agricultural techniques. In 1941 a more systematic approach was born with Canada's "Radio Farm Forum" listening groups: Farmers gathered to listen to radio broadcasts about farming and community development and to discuss what they heard. The farm forum approach was widely adopted in the developing world, starting in India in the 1950s through an All India Radio station in Poona. An evaluation in India showed that in many villages participating farmers used what they had learned on the radio and in discussions. For example, they vaccinated chickens against common diseases, pooled savings to buy purebred bulls, and hired schoolteachers. Others built tile-lined ditches to drain streets (132). Farm forums encourage rapid diffusion of new technology because they make use of group interaction to mobilize farmers' interest and increase motivation. But it is sometimes difficult to sustain farm forums for a long period. The need for a new topic each week sets "too relentless a pace" for both radio producers and group organizers (118).

Most broadcasts on agriculture are open broadcasts—directed at any farmer listening. Such programing can cheaply reach widely dispersed farmers. In Malawi, for instance, the cost of an hour of radio broadcasts is estimated at 0.4 cents per farmer (in 1980 US$) compared with

Tatiana and Johnny

Using Entertainment to Carry the Message

"Cuando Estemos Juntos" ("When We're Together"), a popular song urging sexual responsibility among young people, was the most often played song on the radio in Mexico in March, April, and May of 1986 and on the top 10 or top 20 list in several other Latin American and Caribbean countries (241). It is sung by two popular young performers, Tatiana and Johnny. The ballad's message comes in these words, sung by Tatiana:

> You will see that I'm right
> When I say no
> Even though my heart
> Is burning.

The popularity of "Cuando Estemos Juntos" and a companion song "Detente" ("Wait") was no accident, but the result of creative thinking, extensive planning, and thorough execution. The project that produced the hit record linked a technical assistance and funding agency, the commercial music industry, and youth counseling centers in 10 Latin American countries. The ingredients of success were careful research, a high-quality product, well-known artists, full use of commercial production and distribution systems, a multimedia approach, and an extensive publicity campaign.

Research was the first stage. Johns Hopkins University Population Communication Services, which sponsored the project with funding from US AID, insisted on laying the groundwork carefully. Focus-group studies suggested that certain messages would be both attractive to youth and not offensive to the media managers whose decisions determine what is aired. The messages: (1) Young people should be responsible for their sexual actions. (2) It is acceptable for young people to say "no"—to postpone sex. (3) Young men should be sexually responsible, too. (4) Young people can go to counseling centers in various countries—identified by name and address on posters and in radio and TV advertisements—for professional guidance.

The songs were produced and marketed by a Mexican marketing company, Fuentes y Fomento Intercontinentales (FFI). FFI coordinated distribution and promotion with record companies, family planning associations, and youth organizations in various countries. Packages for radio and television stations included 45-rpm records of the songs, radio or television spots, and music videos for television stations. The record jacket folds out into a colorful, full-size, 2-sided poster. These materials were sent to 3,020 radio stations and 250 television stations in 11 countries. Press kits went to 350 newspapers, magazines, and journals. Brochures about the project were mailed to 3,500 individual journalists. Extra records were sent to radio and television stations for prizes in contests.

The popularity of the songs exceeded expectations (241). The hope was that popular music stations in Mexico City, for example, would each play the song an average of three times a day for three months. Actually, stations played it 5 to 15 times a day for a much longer period. Many radio and television stations wanted to help a socially responsible cause. They often played the spots—one promoting the song, the other using the song to promote the local organizations—free of charge. In Mexico a survey of about 500 young people visiting the Centro de Orientación para Adolescentes (CORA) showed that about 84 percent of 11 to 25 year olds had heard "Cuando Estemos Juntos." Hundreds of young people wrote letters to CORA. Contests were held for the best letters from listeners, with Tatiana and Johnny records as prizes. In Lima, Peru, such a contest generated 7,000 letters in three months. The songs were used in schools in the Dominican Republic to help start discussions of sexual issues. In Bolivia a television station made the songs the basis for a panel discussion program including an archbishop. In Mexico a long-playing record by Tatiana, which includes "Cuando Estemos Juntos" and "Detente," sold almost 300,000 copies in 1986. Numbers of visits and letters by youth to several of the guidance centers mentioned in the promotional spots (exclusive of letters in response to contests) have increased by 200 to 2,000 percent. The songs have been popular even beyond the countries originally planned.

The success of the project can be attributed to these factors:

- Quality was better than usual for popular songs. Top composers, music arrangers, and musicians were involved. The two songs were chosen in a contest entered by more than 20 composers. "Cuando Estemos Juntos" was written by the Argentine composer Juan Carlos Noroña, and "Detente," by the Mexican composer and singer Prisma.
- The audience was clearly defined—as young people age 13 to 18 in Latin America and the Caribbean—and messages were carefully researched. The concepts and the songs were pre-tested with youth groups and radio and television executives.

- Singers with ready-made audiences were chosen. Johnny Lozada Correa, 18, from Puerto Rico, is a former member of the group Menudo—one of the most popular in Latin America—and had recorded one LP as a solo artist. Tatiana Palacios, 17, from Mexico, had recorded one LP and was starting her second. Pairing them created a novelty effect that was synergistic. And both agreed to contribute their royalties to support similar efforts in the future.
- An extensive public relations campaign, including a major press conference, helped to win support among journalists and the public. The songs received wide and favorable publicity in the print media not only in Latin America but also in international news magazines such as *People* and *Newsweek* (211, 229) and on US television.
- Raul Velasco, the host of a popular television program, *Siempre en Domingo*, premiered both of the songs and gave them continued support on his weekly variety show, which reaches 150 million viewers.
- Project managers convinced radio and television stations that a song with a socially responsible message could be a commercial success.

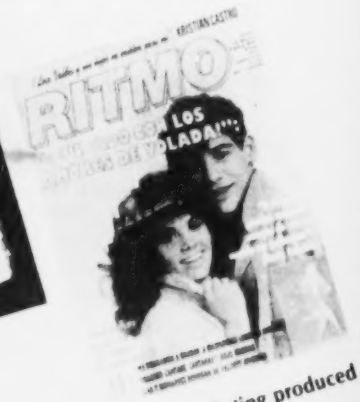
The project offers several lessons. First, entertaining packaging can help messages reach the intended audience. They must be presented through media popular with the intended audience. To create the most entertaining messages in the most popular media, communication professionals need to be involved at all stages—from concept development to final evaluation.

Second, the product has to be of high quality—high enough in a song, for instance, that broadcasters will want to play it free of charge. When family planning associations produce radio and television spots, press releases, photographs, and other materials for the media, these materials should be attractive enough to make the media want to use them.

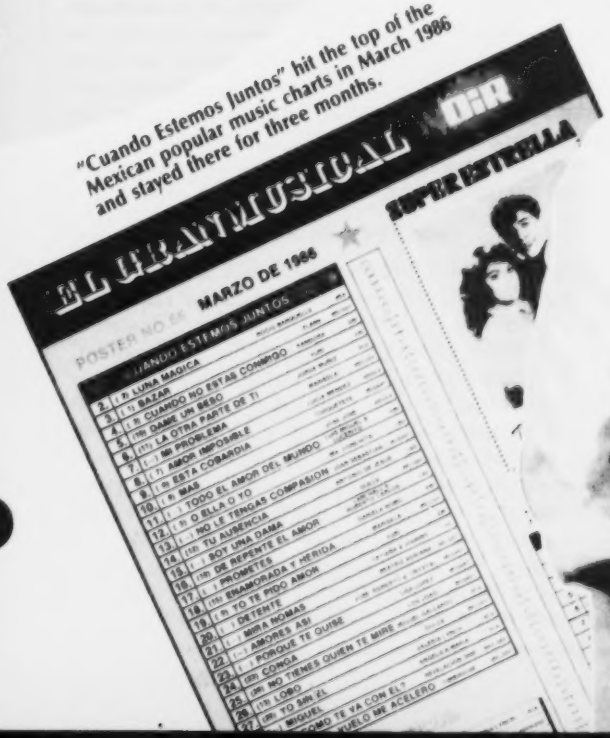
Third, in some countries record companies were the most active in promoting "Cuando Estemos Juntos" to broadcasters—more so than the voluntary youth or family planning agencies. This is not surprising, because record companies are accustomed to working with broadcasters and have various links with them including, sometimes, common ownership. Family planning and other health-related agencies need to learn how to work more closely with broadcasters and indeed with the whole entertainment industry in order to make their messages more effective.

—Patrick Coleman and Frank Segura
Population Communication Services
The Johns Hopkins University

Raul Velasco interviews Tatiana on his popular TV show *Siempre en Domingo*.



Careful marketing produced widespread publicity, including this cover story.


EL UNIVERSAL
MARZO DE 1986
CUANDO ESTEMOS JUNTOS
1 (1) LUNA MAGICA
2 (-) BAZAR
3 (5) CUANDO UN BESO
4 (10) DAME UN BESO
5 (11) LA OTRA PARTE DE TI
6 (17) NO PROBLEMA
7 (-) AMOR IMPOSIBLE
8 (7) ESTA COBARDIA
9 (6) MAS
10 (9) TODO EL AMOR DEL MUNDO
11 (-) O ELLA O YO
12 (8) NO LE TENGAS COMPASION
13 (-) TU AUSENCIA
14 (16) SOY UNA DAMA
15 (-) DE REPENTE EL AMOR
16 (18) PROMETER
17 (-) ENAMORADA Y HERIDA
18 (19) YO TE PIDO AMOR
19 (-) DETENTE
20 (-) MIRA NOMAS
21 (-) AMORES ASI
22 (-) PORQUE TE QUISE
23 (20) CONGA
24 (25) NO TIENES QUIEN TE MIRE
25 (23) LOBO
26 (13) TU SIN EL
27 (-) MIGUEL
COMO TE VA CON EL?
EL SUELO ME ACELERO
SUPERESTRELLA

"Cuando Estemos Juntos" hit the top of the Mexican popular music charts in March 1986 and stayed there for three months.

Problems of Access to the Broadcast Media

Because of problems of access, the potential for promoting family planning and other development goals through radio often goes unrealized. Whether radio stations are government-owned or private, whether they accept advertising and sell air time or not, access for the purpose of presenting family planning messages often is difficult. There are several reasons:

- Taboos exist against mentioning family planning or contraceptives on the air.
- Little air time is devoted to any development messages.
- Production and air time cost too much for family planning organizations.
- Appropriate, high-quality material that broadcasters will use is not available.

Taboos against family planning messages can be overt, as in the policy of many US radio stations to refuse contraceptive advertising (1, 178). Sometimes objections are more subtle. Government stations, for example, may refuse family planning messages, not because of clear-cut policies prohibiting them, but because of fear of disapproval by political or religious authorities—sometimes even in countries where the government actually supports family planning services. Family planning organizations should not assume, however, that broadcasters are unwilling to use any family planning messages. Even in Africa, where contraceptive use levels are relatively low, and until recently most governments gave family planning low priority, broadcasters are not opposed to airing family planning messages (138) (see p. J-866). Working together, family planning organizations and broadcasters may be able to develop programing that suits both groups.

Air Time Limited

Lack of access for family planning messages is often an aspect of a larger problem of scant air time devoted to educational and development messages in general, especially messages intended for poor majorities (17, 38, 78, 98, 110, 122, 156). Surveys indicate that broadcasting for *rural* development receives only one to five percent of all air time in most developing countries (64, 68). Broadcasting for development *in general* may receive somewhat more air time (139).

Government radio stations usually have a legal mandate to support social and economic development. That is no guarantee, however, that any particular development message will receive attention. Stations often are units of ministries of post and telecommunications and must make themselves available for development messages from many other ministries—health, agriculture, education, economic development. Unless there is strong government support for family planning, it may receive little air time.

Political or commercial priorities likewise may limit use of radio for family planning and other development messages, even when governments support family planning. Government stations sometimes devote large blocks of time to political messages, reducing time available for other messages. In contrast, private commercial stations tend to broadcast only what will appeal to the largest number of listeners—usually entertainment. Recently some government stations have begun to accept commercials. As they do, they tend to become even more interested in entertainment because it is easier to sell advertising when audiences are large. For example, All India Radio, a government system, has stations that broadcast popular music, commercials, and little else (168). The types of programing that stations broadcast may influence the formats available for family planning messages.

Costs

Sometimes family planning groups think that they cannot afford production or air time. Even with the most limited resources, however, efforts can be made to obtain free coverage and even free technical assistance from broadcasters (see box, p. J-876). Organizations that produce their own material find that production costs depend largely on the format and purposes of the programing. For example, producing an hour of Radio Math in Nicaragua cost $2,000 (US) in the mid-1970s (78) (see p. J-874). In contrast, producing *and* broadcasting a 15-minute episode of *Naseberry Street*, Jamaica's family planning soap opera, costs $115 (67) (see p. J-863). The much higher cost of Radio Math is explained by the meticulous testing and many revisions necessary to assure effective teaching. The result is a product that can be used for decades. In contrast, *Naseberry Street* does not need such careful preparation, and episodes are not intended for reuse.

Costs of air time, too, can vary greatly. Radio Bangladesh lists a charge of $10.45 (US) to broadcast a 30-second spot announcement nationwide, about $200 for a 15-minute sponsored program, about $50 to produce a signature tune, and about $80 to produce a jingle (105). The Broadcasting Corporation of Niger State, Nigeria, charges about $30 (including tax) for a 30-second spot in prime time and about $27 at other times. Thirty minutes costs about $340 (216). In Sri Lanka 30 seconds costs $1.20, and 15 minutes costs $65 (105). In Turkey a national broadcast costs about $10 *per word* (including tax) just before the morning newscast and about $12 per word in evening prime time (227). Family planning organizations may be able to negotiate special rates or take advantage of time set aside for free public service announcements (39).

Good Materials Needed

A serious problem everywhere is the lack of appropriate, good-quality family planning materials for radio. For many stations the problem is not too little time available, but too little good-quality material on development, including family planning. Most stations are reluctant to air material that is below their usual level of technical quality. Broadcasters themselves will sometimes help produce good-quality material. Sometimes private market research or advertising firms will help free or at a reduced fee. In addition, a number of agencies offer special assistance in putting family planning on radio (see box, p. J-881). Ultimately, family planning professionals need to develop expertise in the use of radio and to assemble libraries of good-quality materials.

Radio brings agricultural information and advice to Haitian farmers. Agricultural broadcasts were one of the first uses of radio for development and are still important. (UNICEF/UNESCO)

16.8 cents for an hour of film brought by a mobile unit and $10 to $30 for an hour of one-on-one consultation with an extension agent. Radio programs produced by Malawi's Extension Aids Branch reach about 30 percent of the nation's farmers and are an important source of information about modern agricultural practices. Radio is especially important to small farmers, who are often bypassed by extension agents. The agents are spread too thin and assume that they can have the greatest impact by concentrating on the largest farms (143). Radio also can give farmers information when they most need it, such as planting or harvest time.

An international farm radio resource, known for its high quality (118), is the Developing Countries Farm Radio Network (DCFRN), sponsored by the Canadian International Development Agency, Massey-Ferguson Ltd. (a Canadian farm equipment manufacturer), and the University of Guelph in Ontario, Canada. The network produces taped radio programs as well as scripts for translation. The programs promote low-cost ways for small farmers to increase production using locally available materials. Programs cover a variety of subjects, such as better use of manure, getting more milk from dairy cows, and marketing farm goods. The format is a short talk, very informal, as if one farmer were advising another. Length is from 2 to 10 minutes. Programs are estimated to reach 100 million farmers (6).

DCFRN often relies on its listeners to choose subjects. Broadcasters in developing countries relay farmers' concerns to DCFRN. When enough listeners express interest in a subject, DCFRN studies it and produces a program. Recently, for instance, DCFRN produced a program on fruit and vegetable soft rot in response to requests from broadcasters in Bolivia, India, Mexico, Montserrat, Papua New Guinea, Paraguay, Sierra Leone, and Western Samoa (47). While treatment of some subjects, such as this one, are widely useful, international programs such as DCFRN cannot address specific local conditions (118).

Another international agriculture program using radio is run by the INADES-FORMATION organization founded by the Jesuit religious order of the Roman Catholic Church and now operating in 14 African countries. Using radio and print materials, INADES provides correspondence courses in agricultural topics for farmers and agricultural extension agents. INADES also publishes a magazine on agriculture and conducts seminars. National offices are located in Burkina Faso, Burundi, Cameroon, Chad, Ethiopia, Ivory Coast, Kenya, Rwanda, Togo, and Zaire (118, 143).

Radio has been used elsewhere to help achieve a variety of agricultural goals. In Botswana it was a key medium in efforts to convince herdsmen that traditional grazing practices harmed the land (35). In West Bengal, India, radio was essential to a correspondence school project teaching farmers modern techniques for cultivating wheat and summer paddy (rice), two cash crops (36). In Pakistan the Barani Project used radio and other media to persuade farmers that they should increase production of wheat, maize, and peanuts by using irrigation, modern methods of seeding and fertilizing, and other modern technologies (34).

Education

The use of radio to teach children in school is nearly as old as broadcasting itself. Radio was used to teach children in Europe and the United States as early as the 1920s (78). In the 1940s in the US, radio was used successfully for diverse educational purposes, from teaching psychology in college to teaching music in elementary school (173). Radio was used in Japan in a 1956 project to teach English and music to students at various grade levels. These students performed as well or better than students in conventionally taught classes (173).

The use of radio to teach adult "learning groups" out of school began in the small town of Sutatenza, Colombia, in 1947, when a parish priest, Father José Joachim Salcedo, saw radio as a way to bring basic education to the townspeople. The idea spread to other rural areas in Colombia, and a private organization, *Acción Cultural Popular* (ACPO), was formed to manage these efforts. Help came initially from the Colombian government and the United Nations Educational, Scientific, and Cultural Organization (UNESCO), but the movement relied primarily on volunteers. ACPO's international branch has brought similar adult education projects to other Latin American countries.

ACPO participants are organized into "radio schools," groups of 6 to 10 adults who live near each other. The groups gather to hear and discuss radio broadcasts designed for them. ACPO furnishes textbooks. In addition to teaching basic subjects, the programs attempt to encourage a sense of productive membership in the larger society. ACPO programs sometimes also promote specific agricultural innovations (21, 112, 205). Adult education by radio now is widespread in Latin America. Radio Santa Maria in the Dominican Republic, which provides primary school equivalency education for adults and children, is a leading example (111). Radio has been widely used by developed nations to teach their languages to ethnic minorities both in the classroom and outside it.

Interactive Radio Instruction

Radio teaching has improved over the years. Lectures are giving way to more animated styles. In the mid-1970s interactive radio instruction was developed as an improvement of radio instruction for the classroom. Instead of requiring children to be passive listeners, interactive instruction requires participation—verbal and even physical. The 30- to 60-minute radio programs take the form of a fast-paced dialogue between two or three speakers. The radio voices

USA:
Learning to Say "No"

As part of a radio series, Robert Hatcher of Emory University passes on practical suggestions from the Northwest Atlanta Parents' Council about learning to resist peer pressure.

- Practice saying "no." Imagine situations and practice your responses. It's important to be prepared.
- Make it simple. You have a right to say "no," and a long explanation is not necessary.
- Avoid the situation. It might be easier to stay away than to have to walk away.
- Change the subject.
- Pick friends who have similar values and interests.

ask a question and the children respond aloud, circle pictures on worksheets, or write in notebooks. Questions asked on the air are answered after a pause for the children's response. The children's correct answers are thus reinforced immediately, and incorrect answers are corrected. Teaching is liberally interspersed with music, and radio teachers sometimes ask the children to sing or do light exercises in place (225).

Classroom teachers need not be highly trained to use interactive radio instruction. Indeed, in a Dominican Republic pilot program, the technique is used in rural areas where there are no formal schools or teachers, only literate villagers who supervise the children (73). In general, interactive radio instruction makes the most difference to students' performance where the quality of local teaching is low or where there are no local teachers or schools (223).

After more than a decade, interactive radio instruction has proved its worth in several countries, including the Dominican Republic, Kenya, Nicaragua, and Thailand. It has been promoted by US AID, the World Bank, and various private organizations (16, 76, 224, 238). Mathematics has been taught in Nicaragua and Thailand (224); and language arts, in Kenya (33). A "Radio Science" project will soon start in Papua New Guinea with assistance from the Education Development Center (88).

Evaluation of several pilot projects has showed that interactive radio instruction often surpasses traditional classroom instruction in similar schools in the same countries. Radio Math, a pioneering 5-year test conducted in Nicaragua in the mid and late 1970s by Stanford University, with support from US AID, was tried with students in grades one through four. Radio Math first graders' average test score was 65 percent, compared with 39 percent for conventionally taught first graders. Over all four grades involved, Radio Math students' average score was 70 percent, and conventionally taught students' average score, 62 percent (176, 224, 238). In Kenya, in a project conducted by the Kenya Institute of Education and the Academy for Educational Development, interactive radio students learning English as a second language performed better than conventionally taught students in all aspects of English usage (33, 135).

Radio listening groups, whether in the classroom or not, have been used only occasionally in family planning and population education (189)—for example, with mothers' clubs in Bangladesh and in family planning campaigns in China. Listening groups dealing with family planning might consist of students in school, adult groups organized by local family planning workers, or health workers receiving initial or refresher training.

Health

Radio has been used in health education and promotion for decades. Radio stations furnished information and schedules for polio vaccination campaigns in the United States in the 1950s and 1960s, soon after the development of polio vaccines. Mass campaigns to promote immunization and other health measures were carried on by radio and other media in China and Brazil in the 1950s and in these and many other countries since (70). China uses radio to broadcast physical exercise programs for office and factory workers. In a major US research project in the early 1970s, radio and television campaigns in selected areas sought to persuade people to eat less fat (78).

About two million people joined radio listening groups in Tanzania during the *Mtu ni Afya* ("Man is Health") campaign, which lasted for 12 weeks in 1973. Each week they listened to a 20-minute radio program. Then leaders elaborated on what was broadcast, discussing material from a text designed for the campaign. The purpose was to promote control of common diseases, such as malaria, hookworm, dysentery, schistosomiasis, and tuberculosis. Emphasized were control measures such as latrine building, better personal health habits, and destruction of reservoirs of stagnant water that breed malaria-carrying mosquitoes. One outcome was the construction of some 700,000 latrines. Another was a nearly sixfold increase in households eliminating vermin-harboring vegetation. Careful planning, starting 18 months before the first broadcast, was a key to success. Audience research after each broadcast helped in planning the next broadcast. Another important element was coordination of radio with other channels of communication. The total cost was about $1 million (US), or about 50 cents (US) per villager reached (70, 80, 189). The campaign was characterized by a high level of political commitment (189), which appears to be necessary for intensive campaigns of this kind, and which is difficult to sustain over the long term.

Another popular use of radio in health has been "radio doctor" programs. A sympathetic announcer, sometimes but not always a real physician, tells listeners how to improve their health—sometimes in response to letters from listeners. The "Dr. Hakim" project in Tunisia, conducted by the government National Institute of Nutrition (NIN) with support from US AID, informed poor mothers of the nutritional needs of infants. (The project began in 1976 after a national nutrition survey showed serious nutrition-related problems among infants and small children—goiter, rickets, caries, and obesity, among others.) Frequent spot announcements emphasized the need for more balanced diets for infants, for breast-feeding, and for exposing infants to sunlight. An actor in the role of Dr. Hakim read the spots on the air. When possible, instruc-

tion in health clinics supplemented the broadcasts. NIN continued the project after US AID support ended in 1978 (183). The main character, Dr. Hakim, became very popular in Tunisia—portrayed in newspaper cartoons and quoted by shopkeepers (183).

Radio was a key component of campaigns conducted in Egypt, Honduras, and The Gambia, with national government and US AID support, to teach mothers how to manage infant diarrhea. The campaigns promoted oral rehydration therapy with homemade or manufactured mixtures of sugar and mineral salts, which are dissolved in water and drunk to replace the water and salts lost in diarrhea (117). Worldwide, this dehydration kills an estimated five million children annually (see **Population Reports**, *Oral Rehydration Therapy (ORT) for Childhood Diarrhea*, L-2, November-December 1980). The campaigns also stressed improved nutrition. The campaign in Egypt began in 1983 with technical assistance from the John Snow Public Health Group. The Honduras campaign began in 1980, and the campaign in The Gambia, in 1981, both with technical assistance from the Academy for Educational Development. Print materials and personal contacts were used along with open radio broadcasts in The Gambia and Honduras. Evaluation in The Gambia indicated that some mothers with little exposure to print materials and few direct contacts with health workers or volunteers learned about oral rehydration just from listening to the radio. The best results were obtained from a combination of communication channels, however (7).

Evaluation showed that the campaigns in the three countries markedly increased knowledge and use of oral rehydration therapy. They reduced death rates from diarrhea in Honduras (7) and, reportedly, in Egypt (74). (In The Gambia, poor child nutrition due to drought and economic problems made it impossible to attribute changes in child mortality to treatment of diarrheal disease.) Similar projects are under way or planned for Burma, Ecuador, Indonesia, Jordan, Lesotho, Malawi, Peru, and Zaire, generally with help from the US AID funded Healthcom project administered by the Academy for Educational Development. A project in Swaziland has been completed and favorably evaluated (75). In Bangladesh, Nepal, and Thailand, social marketing programs have begun to promote and sell packets of oral rehydration salts as well as contraceptives. In Nepal they are advertised over the radio, and sales have been brisk (116, 181).

Good radio programs for family planning need not be expensive. Sometimes one talented person at the microphone is enough. (JHU/PCS)

Radio continues to be widely used in immunization campaigns, especially to alert the public to days when vaccinations are given. In Colombia in 1984 and El Salvador in 1985, for example, heavy radio and other mass media coverage of vaccination campaigns added substantially to the numbers of children vaccinated (9, 48, 66). In the Owo district of Ondo state, Nigeria, immunization rates were low until a campaign was launched in 1983. The campaign enlisted tribal chiefs, schoolteachers, and religious leaders—and used radio and television. Clinics were quickly besieged by mothers with their children (66). In Turkey in 1985 radio was an important element in a multimedia campaign that resulted in the vaccination of nearly 5 million children—92 percent of Turkish children under age five (13).

IMPROVING RADIO

There is room for endless creativity in promoting family planning and other development programs on radio. Diverse approaches have been used—from soap operas with a family planning theme to popular music that promotes sexual responsibility to commercials that advertise brand-name contraceptives. Whatever the format, persuasive communication requires sensitivity to audience concerns and preferences. Assuring this sensitivity requires a systematic, step-by-step approach including:

1. Analysis of potential audiences and available resources;
2. Initial design—the selection of audiences, objectives, messages, and media;
3. Development of the message, including pre-testing;
4. Implementation, monitoring, and assessment;
5. Review and replanning (99, 120, 149, 240).

This step-by-step process is often ignored, with unfortunate results. For example, health care workers and other speakers on radio programs for poor people in a Latin American country recently used, without explanation, such terms as "pathology," "positive malignancy," "multipara," and "dysmenorrhea" (125). And in a North African country in the early 1980s, managers of an otherwise sophisticated communication project aimed at popularizing family planning made no attempt to counter widespread false rumors about the side effects of contraceptives (19).

In contrast, following the process can avoid messages that fail to communicate or, worse, offend the audience. In Scotland in 1979 copy prepared for a radio and newspaper campaign to combat schoolgirl pregnancies used such phrases as "behave yourself" and "getting into trouble." When the material was pre-tested, young people found the wording offensive. The copy was changed before the ads were used (22).

Analysis, including research, is the first step in successful family planning communication. Potential audiences should be identified in terms of (1) language, religion, gender, education, age, socioeconomic status, and other personal characteristics; (2) family planning knowledge, attitudes, and practices; and (3) media habits—how often do people listen to radio, when, what stations, what programs, and what other media do they see and hear? (For a description of methods for audience research, see pp. J-879–882.)

At the same time, a family planning organization considering a mass media communication effort needs to find out about the media, including: (1) What is the coverage of various media—how many people, where, and in what groups? (2) Who are the "gatekeepers" who control access to the media, and what are their attitudes? (3) What are government and media policies on family planning or communication that affect access to media and the content of messages? (4) What resources exist in the communication industry—such as advertising firms, market research firms, production studios, and record distributors—that could help produce materials (99, 149)?

Working with the Media to Promote Family Planning

By working with the mass media, family planning organizations often can get their messages on the radio and into other media free of charge. Radio stations especially may often need interesting material to fill their broadcast hours. This is an opportunity that family planning groups should not miss. They should consider that:

- Policy-makers and community leaders are more likely to support family planning when media coverage is favorable.
- Persuading radio stations to use family planning material at no charge is cheaper and may be more cost-effective than paying for air time.
- Programs produced by broadcasters may have more credibility than if a family planning organization paid to have them broadcast.

There are caveats, too. Most importantly, a family planning organization cannot control how the media use material that they are given. The media may report it inaccurately, distort it, use it out of context, or present an opposing point of view in a more favorable light. Whether this happens depends on the ability, policies, and attitudes of station executives and reporters. Family planning groups need to learn the policies and attitudes of the media and the reporters they deal with. In addition, a good way to help keep coverage accurate is to give the media material that is ready to use on the air or in print.

There are many ways that family planning organizations can encourage media coverage of family planning and population matters. In all cases, getting family planning messages on the air requires providing what the media want rather than trying to force on the media what family planning experts want.

- Organizations can establish themselves as willing, reliable sources of information and opinions for news media about family planning and population and can make top executives accessible to reporters. A prime rule: Never try to deceive the news media.
- Family planning organizations can issue press releases on various topics: the opening of a new clinic, the completion of new population studies, the issuance of a policy statement, a response to a critic.
- They can hold news conferences on especially important stories.
- They can invite broadcasters to cover events, providing background information and helping them arrange interviews.
- They can volunteer to participate in talk shows. Family planning groups should stay alert to the development of public debates—over sex education in the schools, for instance—that their staff members are qualified to discuss on the air.
- They can place public service spot announcements with radio and television stations. In some countries the law requires stations to carry public service announcements from nonprofit social agencies. Sometimes stations carry them voluntarily and even allow social agencies to use their studios to record them.
- They can persuade actors, well-known athletes, and other celebrities to endorse family planning—and then arrange for media coverage. They should make sure in advance that the audience will find the celebrity's endorsement credible.
- They can conduct media contests—for the best family planning story of the year on radio, for instance. This gives family planning organizations an opportunity to honor reporters who have helped family planning and to encourage responsible reporting about family planning. Some family planning organizations, such as the National Family Planning Coordinating Board (BKKBN) of Indonesia, have encouraged the formation of associations of family planning journalists (146).
- A variety of other possibilities exist—some of them very imaginative. A family planning group in East Java, Indonesia, for instance, uses coupons issued by a popular radio music request program to ask that songs be played to honor employees, longtime clients, and volunteer workers for their family planning activities (163).

A cardinal rule in working with the media is to keep an up-to-date list of all media and media personnel interested in family planning. Turnover is common, and lists should be reviewed frequently.

An illustrated guide to media relations is available by writing for Packet #6 to:

Media/Materials Collection
Population Communication Services, Box R
The Johns Hopkins University
624 North Broadway
Baltimore, Maryland 21205, USA

Design, the next step, involves the selection and matching of audiences, objectives, messages, and media. Choices are based directly on research findings. In a process called audience segmentation, specific audiences are identified according to economic, geographic, cultural, demographic, psychological, and other characteristics (149). Then objectives, which should be specific and realistic, are defined for each intended audience. For instance, married women of reproductive age who live in a certain city might be chosen as the audience, with the objective of increasing oral contraceptive use by five percentage points. The basic content of messages is chosen at this stage, although not the actual format or words. Also at this stage, steps must be taken to be sure that the services to be promoted are actually available. Budgets are made, and management responsibilities are defined. Finally, media are selected on the basis of coverage and effectiveness in reaching the selected audiences and transmitting the desired messages.

Although a powerful communication channel in most areas, radio is only one of many channels to consider. Whether radio is used depends on several factors:

- Will radio reach intended audiences?
- Will the government support—or at least permit—radio for family planning communication? Will radio management permit it?
- Is radio time available either free or at an affordable cost at an hour when the intended audience will be listening?
- Can radio broadcasts be produced at an affordable cost?
- What other communication channels are available, and how should they be coordinated with radio?

Development, pre-testing, and revision, the next step, starts with preparing preliminary scripts. Here the initial choices of format and wording are made, and various options are developed. These are then tested on representatives of the intended audience to learn which are most effective. On the basis of this pre-testing, materials are revised. Then they are pre-tested again—and yet again, if possible—to insure that the audience perceives the intended message.

Implementation, monitoring, and assessment involve carrying out the project, measuring results against expectations, and making further revisions on the basis of findings. The media are monitored to be certain that material is used as often as agreed.

Review and replanning starts the cycle again. Postproject analysis should be aimed at examining all aspects of the project, successful and unsuccessful, and then using the findings to plan future projects (18, 149, 189, 240).

Working with Communication Professionals

Communication efforts for family planning can be organized in different ways. Money, of course, determines how much can be done. Developing good relations with existing media and getting as much free coverage as possible is the best way to stretch scarce resources (see box, p. J-876). With more money, family planning organizations can maintain their media relations efforts and also produce some of their own material for the media. Some may be tempted to save money by adding communication production tasks to the responsibilities of current staff. Increasingly, however, family planning organizations are finding that effective mass media communication requires skilled, experienced communication professionals. In the communication marketplace, where so many messages compete for the attention of the audience, the messages that are heard and heeded are those with the most sophisticated appeal and best technical quality. These are best provided by communication professionals.

Colombia: *A Husband's Responsibility*

PROFAMILIA, in its generic condom campaign in 1984 and 1985, broadcast this spot, set in a factory.

Man 1: Hey, John, they tell me you're going for foreman.

John: Sure, to make progress, you have to know what you're doing.

Man 1: I try to . . . but my wife doesn't think I'm responsible.

John: She probably has her reasons . . . because a true man has to be responsible in everything. In work, with women, and in love.

Man 1: You know, you're right. But how does one become responsible in love?

John: Simple . . . it's understanding the woman. It's loving her with responsibility, using condoms.

Man 1: Of course. I didn't know that before. And where do you buy them?

John: In any drugstore or at PROFAMILIA. And besides, they're very inexpensive.

Announcer: Definitely, to love with responsibility is also a man's concern. This is a message from PROFAMILIA.

Should professional communication skills be obtained by hiring staff or contracting with commercial agencies? A large organization with a substantial, ongoing communication program might want to hire staff. It may be difficult, however, to compete with salaries in the advertising and communication industries. For anything short of major, continuing efforts, finding outside help may be more cost-effective. It avoids start-up costs such as equipment purchases and learning time. It avoids management responsibilities for additional personnel. It avoids creating a permanent staff that may not always have enough to do. At the same time, it allows access to the top talent in commercial agencies, if affordable. And it allows access to teams of professionals experienced at working together. The necessary people and firms are available at least in most capital cities (18).

Family planning organizations that work with communication professionals may need to educate them to the differences between promoting family planning and promoting commercial products. For instance, commercial campaigns usually aim at broadening the market share for a specific brand, while family planning communication is aimed, in effect, at expanding the entire market—increasing the number of contraceptive users. Also, advertising

agencies and marketing firms are accustomed to addressing audiences with money to spend—the urban middle class—while family planning organizations may want especially to reach the poor. Commercial firms are familiar with promoting changes in purchasing behavior. They are not familiar with trying to change ideas, beliefs, or behavior associated with sexual relations or with relationships between the sexes. In some places the delicate nature of discussion about family planning may require an indirect approach that is unfamiliar in product marketing (110). Also, commercial firms are accustomed to dealing with private enterprise and may charge high fees—although some firms are willing to work free or at reduced fees for worthy causes.

Achieving Content Quality

There are two kinds of quality in radio. One is the quality of the content—its attention-getting ability, relevance, usefulness, credibility, and entertainment value. The other is the quality of the sound itself, which often is defined in terms of the absence of hiss, clicks, rumble, unwanted fading, and distorted tone balance. Both are vital. Poor sound quality can make content less acceptable. Likewise, fine sound quality is wasted if the content is poor.

Content quality depends on:

- **Attention arousal.** Material at the start of a program—even a brief spot announcement—should be arresting. "Minute one is the time of decision for the listener," says one communication expert (192). Emotional dialogue, provocative questions, and peculiar voices are sometimes used (192). Other devices include music that is very familiar or that has a rapid tempo or full orchestration; a question or joke to introduce a speaker; and loud applause from an audience (141).
- **Liveliness.** As one expert puts it, "Listeners can *hear* smiles on the faces of radio announcers" (192). Enthusiasm is communicated through high energy levels in performers, announcers, lecturers, and actors. This quality has been most fully developed in commercial radio advertising.
- **Unity.** Programs should be unified, with no more than a few, clearly defined purposes. Elements that do not contribute to these purposes should be eliminated. Transitions between various portions of a program should tell listeners what relationship the new material has to program purposes. Even a series of programs should have unifying purposes, themes, elements, or settings (141). For instance, a recurring element in Jamaica's family planning soap opera, *Naseberry Street*, is the setting: a family planning clinic (see p. J-863).
- **Timeliness.** Radio messages can be linked with recent, current, or upcoming events in various ways. For example, a condom social marketing program may broadcast the endorsement of a player who has just helped win an important soccer match (192).
- **Need satisfaction.** Messages should give listeners information they want to have. Music or drama should help to satisfy listeners' emotional needs. Drama, in particular, offers vicarious emotional experience and therefore is one of the most appealing radio formats (192).
- **Realism and credibility.** Audiences should be able to identify with actors in a drama. They must find speakers on informational programs believable. (In Honduras a soccer player promoting breast-feeding provoked laughter (23).) If experts on family planning do not speak with assurance, professional speakers might be substituted. In media-saturated countries, however, opinion or information may be more credible if it comes from the man-on-the-street or from actual experts rather than actors (192). Achieving realism and credibility depends on good audience research and careful choice of speakers (240).
- **Variety.** The same theme or idea needs to be expressed in many different ways. In Colombia, for instance, five different radio spots all made the point that using condoms is responsible (see p. J-864). Even within a single radio program, various ways of expressing the theme should be found. The longer the program, the more variety it should offer (141).
- **Pace and sequence.** Programs should build toward a climax. Interest not only should be aroused at the beginning but also should be maintained throughout the program, often with small climaxes leading up to the final climax. Every sound, word, or piece of music must propel the story forward (141, 192).
- **Local appeal.** Familiar voices, music, and events on the radio are appealing. Well-known local figures draw audiences for interview programs.

Books on High-Quality Sound

Three books can help the family planning professional achieve high-quality sound on radio:

- Keating, R. *Grass Roots Radio.* (1977) 67 p. $5 (US), includes tape of radio programing by family planning associations. Written specifically for family planning professionals. Covers many other aspects of family planning radio in addition to sound reproduction. Order from the publisher: International Planned Parenthood Federation, Regent's College, Inner Circle, Regent's Park, London NW1 4NS, UK.
- Thom, R., Merrick, C., Schumacher, J., and Taylor, D.R. *Audio Craft: An Introduction to the Tools and Techniques of Audio Production.* (1982) 183 p. $15 (US) plus $2 postage. A complete, rather technical description of the elements of sound quality and the equipment and techniques needed to achieve it. Order from the publisher: National Federation of Community Broadcasters, 1314 14th Street, NW, Washington, D.C. 20005, USA.
- Josephson, L., ed. *Telling the Story: The National Public Radio Guide to Radio Journalism.* (1982) 228 p. $16.95 (US) plus $2 postage. Includes sections on recording, editing, and producing news and features, and new technologies for radio. Order from the publisher: Kendall-Hunt Publishing Company, 2460 Kerper Boulevard, Dubuque, Iowa 52001, USA.

Achieving Sound Quality

Sound quality depends partly on technique, partly on equipment—although expensive, state-of-the-art equip-

ment is by no means necessary for high-quality audio production. Definitions of good sound quality can be highly technical. Still, a few simple rules are helpful:

- **Take good care of equipment.** Tape recorders and microphones, the basic tools of radio, are delicate. They should be protected from dust and sand. Tape heads—the devices that record, play back, and erase tapes—should be cleaned periodically with alcohol or they will begin to produce fuzzy sound or blank spots (82, 87).
- **Mix sounds judiciously.** Radio production often involves combining—"mixing"—sounds in various ways. Background sound effects create atmosphere and help listeners visualize the setting of the action. While it sometimes is appropriate to mix music and voices, music should not overwhelm the voice.
- **Understand the meaning of audio techniques.** Every audio technique has a meaning. For example, a crossfade, in which one sound element is faded out as another is faded in (193), may suggest to the listener a change in time. A hard splice—an abrupt change from one sound element to another—may suggest a change of place but not of time.
- **Avoid bad tape splices.** Radio production usually involves editing tapes to remove unwanted sounds. A special splicing block should be used so tape can be cut on a bias to avoid noticeable clicks (82, 87).
- **Use microphones properly.** Omnidirectional microphones, which pick up sounds from all directions, sometimes should not be used outdoors, where they will pick up extraneous sounds. Cardioid microphones are sensitive to sounds coming from only one direction and thus are sometimes better for outdoor work (87). During interviews, cardioid microphones should be held at about shoulder level and moved from person to person. Optimal distance is from 6 to 12 inches from the speaker. Microphones generate extraneous noise if something rubs against them or their cables (87, 193).

Books that offer more detailed guidance on sound quality are listed in the box on p. J-878. These books also can help family planning organizations judge the production capabilities of radio stations.

Successful radio does not always require expensive equipment, skilled producers, or talented actors. By choosing the right format, beginners with simple equipment can produce good-quality radio. For example, interview programs can be recorded on a simple, inexpensive tape recorder (87). In contrast, a weekly soap opera calls for a well-equipped studio, skilled writers, trained actors, and a sound effects library.

Much depends on what listeners are accustomed to. Wherever family planning organizations work in radio, they need to attain high technical quality according to local standards.

MONITORING AND EVALUATION

To assure high quality and maximum impact, radio broadcasting about family planning needs monitoring and evaluation at every stage. This continuing audience feedback helps to direct ongoing planning and to identify problems early. It gives project staff the opportunity to make changes in time to improve the project (80, 106, 149, 158, 161, 165, 184, 189).

Pre-testing helps make sure that the audience responds to the message as intended. Here workers from the Centro de Orientación Familiar in Bolivia play tapes of planned radio spots and ask the listener questions about what she has heard. (JHU/PCS)

The value of monitoring and evaluation has long been recognized. Until recently, however, monitoring of mass media communication received little attention due to the expense and staff time required. Evaluation was limited to after-the-fact, or summative, evaluation, by outside consultants, for projects that could afford it. While evaluation of this type is valuable, evaluators and staff are often placed in adversarial positions, and results come too late to make improvements in the program. Today organizations increasingly recognize the need for ongoing monitoring and evaluation by project staff and are incorporating it into new family planning and other development communication projects (80, 106, 147, 158, 161, 166, 184, 189).

Audience Research

Family planning communication projects use a variety of methods to gather information from audiences and potential audiences. These methods can range from the simple and inexpensive to the complex and costly. The data gathered answer such questions as: (1) Is the material broadcast? (2) Is it reaching the intended audience? (3) Is the content understood? (4) Is the message culturally appropriate? (5) Does the message change knowledge or attitudes? (6) Does the message influence behavior? Research on radio audiences has a long history. The British Broadcasting Corporation began audience research in the UK as early as 1936 (182).

Surveys are one of the most common methods of monitoring communication activities. They may range from small, informal surveys, which cost very little, to large surveys based on probability samples, which can be expensive. Various types of audience awareness surveys and pre- and post-evaluation surveys are used.

In an audience awareness survey, people may be asked if they have heard or seen any message, story, or advertisement about family planning during a specified period of time. They may be asked to listen to specific spots or jingles and identify them. Sometimes "tracers" are used—special messages reserved for different media—so that researchers can track which media reached the largest

Australia:
Saying "No"

This radio spot is broadcast for the Family Planning Association of Queensland, Australia.

Teenage Male No. 1: Come on, you would if you loved me.

Teenage Female No. 1: If YOU really love ME, you won't pressure me.

(Pause—change of scene)

Teenage Female No. 2: Hey, I thought I really turned you on.

Teenage Male No. 2: You do, but gee, you're only 15.

Announcer: If it's not the right time, the right person, or the right place, say "no." It's your life; it's your decision.

number. The responses tell program managers whether they are reaching their target audience. In 1983 an extensive survey in Bangladesh found that the percentage of people who were aware of mass media messages on family planning varied from 74 among urban men to 31 among rural women. Among those who were aware of the messages, however, 83 percent of all respondents had heard them on radio (121). A 1984 survey in Jamaica found that 94 percent of respondents were aware of the 2-child message of the National Family Planning Board campaign (see p. J-863). A year later, another Jamaican survey found that 75 percent of those interviewed listened regularly to the family planning soap opera *Naseberry Street* (see p. J-863). In 1986 an Indonesian survey found that 31 percent of men interviewed were aware of the campaign promoting DuaLima condoms (see p. J-859). Among current users and ever-users of condoms, 53 percent had heard a DuaLima ad on the radio (188).

Going beyond just awareness of programing, surveys often try to measure the impact of a particular program or advertisement on knowledge or behavior. In a 1978 survey in Costa Rica, for example, *Diálogo* listeners scored significantly higher in terms of knowledge, attitude, and practice of family planning than nonlisteners (see p. J-862) (164). In 1979 Bangladesh Radio conducted a survey of 300 rural couples in order to evaluate the family planning program *Sukhi Sangsar* (*Happy Family*). The 20-minute magazine-style program has been broadcast nationwide six days a week since 1975. Although 84 percent of respondents knew about the program and approved of it, only 12 percent used contraceptives—the same as the average for all rural Bangladesh at the time. On the basis of this finding, evaluators recommended that the program deal more directly with the needs and concerns of rural listeners (5, 69).

Pre- and post-surveys are a standard technique used to measure the impact of specific radio programing on individuals' knowledge, attitudes, and practice (KAP) of family planning. The 1984–85 PROFAMILIA mass media campaign promoting condoms in Cali, Colombia, utilized pre- and post-surveys for this purpose. So did an earlier Colombian project (11, 12) (see p. J-864), as well as projects in Honduras (187) and Iran (100).

Communication projects sometimes can make use of surveys conducted by others—at considerable savings. Contraceptive prevalence surveys, which usually sample married women of reproductive age, sometimes include questions on exposure to family planning messages through the mass media (10, 15, 104, 128). Table 2 shows results from four surveys taken in the late 1970s. Questions about awareness of mass media family planning messages are also included in some of the Demographic and Health Surveys, now planned for about 30 countries. To be useful for evaluation, of course, these data need to be correlated with information about program efforts.

Family planning programs may be able to add questions to consumer surveys conducted by market research firms. For example, in Indonesia the National Family Planning Coordinating Board (BKKBN) pays about $3,000 (US) to have seven questions about family planning messages and media included in a quarterly survey of 2,000 urban housewives conducted by P.T. Survey Research Indonesia (146).

Focus groups may be consulted at various stages (22, 199). These consist of about 6 to 12 people representative of the intended audience. They discuss the subject in their own words and may comment on messages or materials that have been developed (59, 199). For example, in 1984 focus groups were used in Mexico to pre-test radio spots for the Federación Mexicana de Asociaciones Privadas de Planificación Familiar (FEMAP). As a result some spots were deleted or changed. For example, most focus-group participants thought that tubal ligation was expensive and thus unavailable to them. Therefore the spot promoting tubal ligation was changed to emphasize that clinic services are free of charge (222).

A similar source of information is "listening panels"—community leaders who report on their own and other villagers' reactions to radio programs (87). Field trips can gather audience information, too. All India Radio, for instance, sends radio producers, accompanied by health and social workers, to rural villages to learn more about villagers' concerns (159). Individual interviews by skilled interviewers are another possibility (110).

Table 2. Percentage of Women of Reproductive Age in Union Who Have Heard or Seen at Least One Family Planning Message via Mass Media, by Medium, as Reported in Contraceptive Prevalence Surveys, 1978–1979

Country	Ref. No.	Year	Any Mass Medium	Radio	Television	Poster	Pamphlet	Newspaper	Cinema
El Salvador	15	1978	94	88	21	43	47	26	5
Guatemala	15	1978	65	57	9	27	20	11	3
Jamaica	154	1979	NA	91	46	——55——		53	NA
Panama	15	1979	86	47	28	64	42	20	15

NA = not available

Sources of Assistance for Radio on Family Planning

International, regional, and national organizations offer a variety of assistance with radio programing for family planning—ranging from substantial technical and financial assistance to scripts that can be adapted to local needs.

Johns Hopkins University Population Communication Services (JHU/PCS), administered through the Population Information Program and supported by US AID, provides a full range of technical and financial assistance to public and private organizations in developing countries that want to expand and improve family planning communication. Assistance may involve needs assessment, project development, funding, training, audience analysis, pre-testing, and evaluation (147). The Media/Materials Collection at JHU/PCS consists of family planning brochures, posters, tapes, and other materials from over 80 countries. Radio programs are available on tape or in scripts free of charge to developing countries. (Population Communication Services, The Johns Hopkins University, 624 North Broadway, Baltimore, Maryland 21205, USA)

Clearinghouse on Development Communication, operated by the Academy for Educational Development (AED) with support from US AID, is a center for materials and information on applications of communication technology to development including family planning. A quarterly newsletter and summaries of communication projects are available free to developing countries. (Clearinghouse on Development Communication, Academy for Educational Development, 1255 23rd Street, N.W., Washington, D.C. 20037, USA)

International Planned Parenthood Federation (IPPF) provides its affiliates with technical assistance in communication and other aspects of family planning program operations. IPPF offers an audio tape cassette, "Grass Roots Radio," of examples of radio used by family planning associations, with accompanying manual, for $5 (US) (87). (International Planned Parenthood Federation, Regent's College, Inner Circle, Regent's Park, London, NW1 4NS, United Kingdom)

Voice of America (VOA) has produced a 52-part radio series, *Your Healthy Family*, on tape in several languages. Two programs deal with reproductive health: No. 22, "Family Spacing," and No. 23, "Fertility and Venereal Disease." An 8-part series, *Staying Healthy—Health Talks for Men*, includes such topics as "Pregnancy Control," "Infertility," "Venereal Disease," and "AIDS." Both series were produced primarily for African radio stations. VOA tapes in various languages and scripts in English are free to stations and interested persons outside the US (123, 201). (Voice of America, Africa Field Service, Room 1617, 330 Independence Avenue, S.W., Washington, D.C. 20547, USA)

Asia

Development Training and Communication Planning (DTCP), the Asia and Pacific service unit of the United Nations Development Program, provides technical assistance in communication including program development, training, management, and monitoring and evaluation. (UNDP/DTCP, P.O. Box 2-147, 19 Phra Atit Road, Bangkok 10200, Thailand)

The Asia-Pacific Institute for Broadcasting Development (AIBD), funded by UNESCO, provides broadcasting training and program development assistance. AIBD recently produced 100 prototype radio and TV programs dealing with population matters (2). (Asia-Pacific Institute for Broadcasting Development, P.O. Box 1137, Pantai Bharu, 59700 Kuala Lumpur, Malaysia)

The International Press Foundation of Asia offers the news service Depthnews, providing broadcast-ready copy on population and family planning issues in Asia. (Depthnews, International Press Foundation of Asia, P.O. Box 1843, Manila, Philippines)

The PCF Media Service, a project of the Philippine Population Center Foundation, publishes *Development Communication Reports* twice monthly in English. It provides Philippine broadcasters with news and information on population and family planning. Copies are available outside the Philippines for the cost of mailing. (PCF Media Service, P.O. Box 2065, MC, Makati, Metro Manila, Philippines)

Latin America

The UNESCO Regional Office for Education in Latin America and the Caribbean provides communication training and technical assistance for broadcast production dealing with a variety of development topics including family planning. (UNESCO Regional Office for Education in Latin America and the Caribbean, Casilla 3187, Santiago, Chile)

Africa

L'Union des Radiodiffusions et Télévisions Nationales d'Afrique (URTNA) operates the Family Health Broadcasting Project with help from JHU/PCS. The project expands URTNA technical assistance to cover family planning. This assistance goes to URTNA's 42 broadcast organization members (196). The URTNA Programme Exchange Centre in Nairobi collects radio and TV tapes on family planning and maternal and child health and distributes them to members. A catalogue is scheduled to be published in 1987. URTNA publishes a bulletin, *Family Health Communication*, in French and English, containing broadcast-ready copy on family planning and related health issues. (L'Union des Radiodiffusions et Télévisions Nationales d'Afrique (URTNA), Boite Postal 3237, Dakar, Senegal, or URTNA Programme Exchange Centre, P.O. Box 50518, Nairobi, Kenya)

The Pan-African News Agency (PANA) provides daily news and information by teletype in English, French, and Arabic to broadcast and print organizations in 39 member-nations. In 1985 it began a weekly *Science and Technology Bulletin*, which focuses on development issues including family planning and maternal and child health. (Pan-African News Agency, P.O. Box 4056, Dakar, Senegal)

(continued on next page)

Sources of Assistance for Radio on Family Planning

(continued from previous page)

The African Council on Communication Education (ACCE), a private, nonprofit organization, offers needs assessments, training, and information on media and curriculum development in communication. ACCE publishes various materials on communications training and development for Africa. (ACCE, P.O. Box 47495, Nairobi, Kenya)

The UNESCO Regional Office for Science and Technology for Africa, located in Nairobi, provides communication training and technical assistance for radio program production. (UNESCO, P.O. Box 30592, Nairobi, Kenya)

Middle East and North Africa

The Arab States Broadcasting Union (ASBU), with funding from UNESCO, supports population communication activities including development of family planning broadcast materials. ASBU also operates a training center for broadcasters and transmits regional programing via satellite. (Arab States Broadcasting Union, ASBU/UNESCO Project, B.P. 65 El-Menzah, 1004 Tunis, Tunisia)

Listeners' letters are a less formal but useful and inexpensive source of feedback from literate audiences. One long-running family planning radio program, *Grains of Sand in the Sea* in Indonesia, has never been formally evaluated because listeners' letters indicate ongoing support for the program (see p. J-859) (145).

Diálogo, the Costa Rican radio program, receives thousands of letters each year asking for information and assistance (see p. J-862). Material in the letters often suggests topics for use in future broadcasts (133, 164, 189). In 1975 a content analysis was carried out on 800 letters sent to *Diálogo*. Content analysis measures message content by counting how often certain words, concepts, or themes appear (215, 228). In the *Diálogo* study the topics most frequently mentioned by women were menstruation, virginity, conception, female sexual dysfunction, courtship, and marriage. Men most often wrote in with questions about masturbation or frequency of coitus. Many men also had questions about the male genitalia, sexual dysfunction, and family planning. One observation from the analysis was that listeners still had much to learn about human sexuality and contraception (133). Content analysis is also performed on radio programs themselves to assess whether intended messages and themes are actually being broadcast.

A woman hired to monitor family planning radio broadcasts in Costa Rica listens while she sews. Monitoring of this type checks that broadcasts take place as planned. (JHU/PCS)

In 1986 Latin American radio stations sponsored contests centered on Tatiana and Johnny's songs (see p. J-870–871). Thousands of young people wrote letters in response. In Peru, for example, as part of a contest 7,000 young people wrote in explaining what "responsible parenthood" meant to them. Preliminary analysis of the letters by the Instituto Peruano de Paternidad Responsable shows that young people understood the concept of sexual responsibility (65).

Sales and service statistics can be used to evaluate the impact of mass media advertising. Social marketing programs rely on sales data as a continuing indicator of program performance and particularly of advertising effectiveness (14, 44, 172, 181). Since most social marketing projects advertise in several media, it is often difficult to evaluate radio separately on the basis of sales data alone. To gather more specific information, many social marketing programs have carried out small surveys, interviews at pharmacies, and focus-group sessions (see **Population Reports**, *Contraceptive Social Marketing: Lessons from Experience*, J-30, July-August 1985).

Some family planning organizations measure the impact of radio promotion by the number of new clients who attend local clinics. An early Honduran study found that during a 5-week family planning radio campaign the number of new clinic clients increased from 11 per week to 35 per week, then declined to 15 per week following the campaign (187). A Colombian study in the early 1970s reported a similar pattern of increases in the number of new clients during each of several radio campaigns, three to six months in length, followed by declines three to five months later (12, 37) (see p. J-864). A 1984 project in Honduras found that the number of new users did not increase but that current users were less likely to discontinue use during a brief radio and print campaign (90). Findings from these and other projects suggest that the reinforcement provided by family planning radio campaigns is important to sustain the overall growth of contraceptive use.

Evaluation Costs

Monitoring and evaluation are often skipped because of time and money. Yet monitoring and evaluation are essential to maximize project impact, and they can be tailored to the scale and budget of the project. There is little or no cost for "man on the street" interviews used to measure

opinions of the radio listening audience. Small-scale evaluations using focus groups vary widely in cost depending on the country involved, the resources available, and the information sought. Estimates range from $500 to $2,000 (US) for each group (86, 144). Most of the expense comes from training focus-group leaders, analyzing results, and preparing the report. Surveys cost considerably more both because sample frames are needed to be sure that those surveyed are representative and because more people are interviewed. It has been estimated that a typical evaluation survey involving 2,000 interviews costs from $15,000 to $40,000 (US) (209). Piggybacking family planning questions onto larger surveys can save substantially (see p. J-880).

Getting the Most Out of Monitoring and Evaluation

Monitoring and evaluating the use of radio to promote family planning involves many considerations. Some general principles have been suggested (147, 166, 189):

- **Monitoring and evaluation should be included in all family planning communication projects**. Evaluation is an ongoing process that takes place at each stage of a project. Monitoring and evaluation are essential, not a luxury. They enable staff to determine whether objectives are being met and, if necessary, to make changes.
- **The primary purpose of monitoring and evaluation is to improve the project**. Evaluation plans should be drawn up with this in mind. If monitoring and evaluation are seen as aimed chiefly at rewarding or punishing past performance, the evaluation will focus on unproductive concerns, and staff may be resentful and uncooperative. Since improving the project is the purpose of monitoring, special attention should be paid to monitoring early in the project, while there is still time for changes to make an impact.
- **Project performance should be measured against realistic, quantitative objectives**. First, objectives must be set at modest levels. A communication effort alone cannot be expected to bring about rapid and radical changes in many people's thinking or behavior. Second, the changes measured must be reasonably attributable to a communication effort. Reasonable measurements would include the level of familiarity with messages, increases in clinic attendance, or the level of awareness of sources of supplies and services. In contrast, changes in the crude birthrate are not a good measure for evaluating communication efforts. Too many other factors influence birthrates. Third, the measurements must fit project goals. For example, clinic attendance would be a poor measure of a proj-

In Bangladesh women with their children gather around a radio to listen to a family planning broadcast. Radio reaches many people with no access to other communication media and very little other contact with the rest of the world. (Kay Chernush, World Bank)

ect intended to promote the sale of condoms through local retail outlets.

- **Evaluation should, as much as possible, be planned and carried out by project staff, with outside technical assistance as needed.** Insiders are more likely to obtain accurate, timely information that can contribute to the project. Also, by conducting the evaluation, staff learn how to improve the project, rather than receiving information secondhand.
- **There is no one best methodology to evaluate all family planning communication projects.** Different situations call for different techniques of evaluation. Using multiple methods increases comprehensiveness, validity, and reliability, but also expense.
- **The results of evaluation should be presented in a simple and precise manner.** Complex and lengthy reports may be difficult for staff to use.
- **The results of evaluation are important and should be analyzed and discussed by everyone involved.** Thorough, many-sided discussion will help to determine the reasons for successes and shortcomings and to devise solutions to problems. Original objectives should be reviewed, to make sure that they were realistic, and revised if necessary.
- **Lessons learned should be shared with other organizations in meetings and through publications.** This will help to avoid duplication and may generate ideas for new family planning radio projects.

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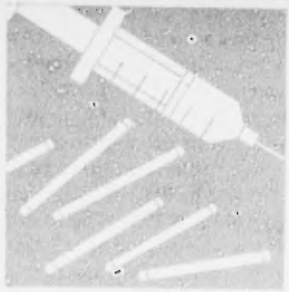

Population Reports

Series K
Number 3
March-April 1987

INJECTABLES AND IMPLANTS

Population Information Program, The Johns Hopkins University, Hampton House, 624 North Broadway, Baltimore, Maryland 21205, USA

Hormonal Contraception: New Long-Acting Methods

Editors' Summary. Before the year 2000 women around the world may have up to five new family planning methods to choose from. All will be very effective, convenient to use, and long-acting—from one month to five years. All use a progestin, a type of female hormone that is also used in birth control pills. One new method, Norplant, has already been approved in seven countries. Other new methods are in various stages of development and testing. The new methods share one obvious disadvantage. To varying degrees, all change or disrupt menstrual patterns. If women expect this and know it is not harmful, many are willing to accept it.

Norplant implants have been approved in Finland, Sweden, Ecuador, the Dominican Republic, Indonesia, Thailand, and Colombia, and applications are pending elsewhere. Already about 75,000 Indonesian women have used Norplant. Placed just under the skin on the inside of a woman's arm, six capsules release the progestin levonorgestrel at a slow, steady rate. For five years they prevent nearly all pregnancies. Then they must be replaced. Similar products, using different progestins and/or fewer implants, are being developed. Norplant-2, a 2-rod system that lasts at least three years, has been approved in Finland. Application for US approval will be filed in 1987.

Biodegradable implants also are placed under the skin, but they eventually dissolve and disappear. There are two types—(1) Capronor, a single capsule containing levonorgestrel, and (2) three or four pellets of the hormone norethindrone combined with small amounts of cholesterol. Capronor is expected to prevent pregnancy for at least 18 months; the pellets, for at least 12 months. They may be available by the mid-1990s.

Injectable microspheres and microcapsules, suspended in a solution, are given with a hypodermic needle. The tiny particles of different sizes, consisting of hormone in a polymer carrier, dissolve and release hormone at various rates, providing a nearly constant dose that prevents pregnancy for one to six months. The first microsphere contraceptive may be available in some countries in the early 1990s.

Monthly injectables add an estrogen to a progestin to minimize menstrual changes. Some 1.5 million women in China and Latin America already use monthly injectables. Two new monthly injectables may be available as early as 1988.

The **vaginal ring** is placed by the woman in her vagina, where it gradually releases hormone. A 3-month levonorgestrel ring may be available in some countries by 1988. A 3-month progesterone ring is being developed for breast-feeding women.

The precursors of these new methods are the **long-acting injectable contraceptives**—the 3-month Depo-Provera and the 2–3 month Noristerat. They have been available for over a decade. Depo-Provera is approved for contraception in at least 90 countries; Noristerat, in more than 40. Some five million women use them. Animal studies raised fears that long-acting injectables might cause cancer. Preliminary results from new studies of women are reassuring for the most part, but some questions remain.

When new long-acting methods become available, marketing and program development are essential. Production must be arranged; providers trained; logistics systems in place; and supplies available. The media, the health care professions, and other opinion leaders must be thoroughly briefed in advance. Couples must learn about the new methods. If these are properly introduced and made continuously available, there will soon be a much broader choice of contraceptives for women. Effective, reversible, long-acting hormonal contraception will be available for nearly every couple, whatever their plans and needs. **End of Editors' Summary.**

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NORPLANT IMPLANTS

Norplant* impiants consist of flexible, nonbiodegradable tubes filled with levonorgestrel, a synthetic hormone of the progestin family. The implants are placed under the skin on the inside of a woman's upper or lower arm. The hormone is slowly released at an almost constant rate for several years. Developed by the Population Council, Norplant has been tested in more than 44,000 women in 31 countries (189). It has proved to be highly effective, safe, and well-liked by its users. By 1987, a 6-capsule Norplant system had been approved for marketing in seven countries—Finland, Sweden, Indonesia, Thailand, Ecuador, the Dominican Republic, and Colombia (85). Applications for approval have been filed in many other countries.

Norplant implants come in two forms. The first, called simply Norplant, consists of six hollow Silastic (silicone rubber) capsules. Each capsule is 34 mm long, with a diameter of 2.4 mm, and contains 36 mg levonorgestrel. The ends of the capsules are sealed shut with Silastic adhesive. This is currently the more widely used of the two systems. It is highly effective in preventing pregnancy for five years. The newer system, called Norplant-2, consists of two solid Silastic rods, each 44 mm long. A total of 70 mg levonorgestrel is dispersed in the matrix of each rod. Norplant-2 is highly effective for at least three years. This system was approved in Finland in 1987. An application for approval in the US will be filed in 1987. The materials in Norplant and Norplant-2—Silastic rubber, Silastic adhesive, and levonorgestrel—have been used safely for years in a variety of medical applications (192). Levonorgestrel is the progestin in several popular brands of oral contraceptives.

* NORPLANT is the registered trademark of the Population Council for contraceptive subdermal implants.

This issue of Population Reports was prepared by Laurie Liskin, Sc.M., and Richard Blackburn, M.S., with the assistance of Rula Ghani, M.S., on the basis of published and unpublished materials, correspondence, and interviews. Comments and additional material are welcome.

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Preintroductory trials of Norplant have taken place all over the world. Over 40 percent of participants are in Asia and the Pacific, primarily in China, Indonesia, and Thailand. Another 30 percent are in Latin America, primarily in Brazil, the Dominican Republic, and Ecuador. About 2,500 Egyptian women and more than 1,000 women in sub-Saharan Africa also have participated. Preintroductory trials of Norplant-2, involving more than 4,500 women, are in progress in Chile, Colombia, China, the Dominican Republic, Ecuador, India, Mexico, Thailand, and the US (192).

With both Norplant and Norplant-2, levonorgestrel diffuses through the Silastic membrane at a steady, slow rate. Within 24 hours after insertion, levels of levonorgestrel in blood plasma are high enough to prevent ovulation (18). The daily release averages 50 to 80 µgs in the first year of use, then declines to about 30 to 35 µgs per day over the next five years (18, 56, 208). In the first year, this is about the same as the daily dose of levonorgestrel in progestin-only oral contraceptives and one-fourth to one-half the dose in combined estrogen-progestin oral contraceptives.

Insertion and Removal

Inserting and removing Norplant implants are usually minor surgical procedures that require local anesthetic and a small incision (see box, p. K-62). Removal is more difficult and takes longer than insertion. If health workers are adequately trained and maintain sterile conditions, however, complications are unlikely to occur with either procedure.

The best time to insert Norplant implants is when a woman is menstruating or no later than five to seven days from the start of menstrual bleeding. This ensures that she is not pregnant. At other times, the woman should be given another contraceptive method for the rest of her cycle and asked to return to the clinic when she is menstruating (180).

Norplant capsules and rods are inserted just under the skin usually in the inside of the upper or lower arm. An experienced practitioner can insert the six capsules in 5 to 10 minutes. The two rods in Norplant-2 are easier to insert and remove than the six capsules in Norplant (6, 115, 191).

In multicenter clinical trials infection and other complications after insertion have been rare; only 3 women in every 1,000 ever developed infections (235). In an Indonesian study, however, there were 12 infections treated with antibiotics in 828 insertions, or 14 per 1,000 (6). With the exception of one trial in India (115), studies show that the capsules or rods are rarely expelled. Expulsion may occur if the insertion site becomes infected (269) or if the im-

plants are placed too close to the incision (232). Bruising often occurs during insertion. Rare complications are mild itching and formation of scar tissue around the incision (137, 269).

Insertion causes little or no immediate pain for most women, although the area may be bruised and sore for several days. Among 700 Thai women, for example, 69 percent reported feeling no pain during insertion, 28 percent felt slight discomfort, and only 3 percent reported moderate to severe discomfort (211). The capsules and rods are flexible and fairly soft. Once inserted, they do not cause any pain or interfere with a woman's activities (191).

Removing 6-capsule Norplant usually takes about 15 to 20 minutes and usually requires only one small incision. In one US trial about 20 percent of 106 removals took more than 30 minutes, however. Ordinarily, only one incision was needed, but in about 5 percent a second incision was needed. As the nurse-practitioner performing removals became more experienced, however, problems were much less frequent (52). Generally, implants are relatively easy to remove if they were inserted properly—that is, just under the skin. They are harder to remove if they were inserted deeply (6, 132). Sometimes one or more implants, or a piece of an implant, cannot be removed easily. Occasionally, the implants cannot be removed on the first attempt. How often these problems occur has not yet been determined.

When the implants are removed, a new set can be inserted immediately. If the original implants have been removed easily and the insertion site is not swollen, the new implants can be inserted in exactly the same place. If the removal causes swelling or trauma, however, the implants should be inserted either in the other arm or through the original incision but facing the opposite direction (191).

How often do complications occur after removal of the implants? In two US trials no infection or other complications have occurred after a total of about 150 removals (52, 132). In 122 removals at an Indonesian clinic, 11 hematomas (bleeding under the skin) and two infections occurred in the week after removal (6). No treatment was needed for the hematomas. The infections were treated with antibiotics (275). Information is not available from other countries. As implants become more widely available and as less experienced doctors perform insertions

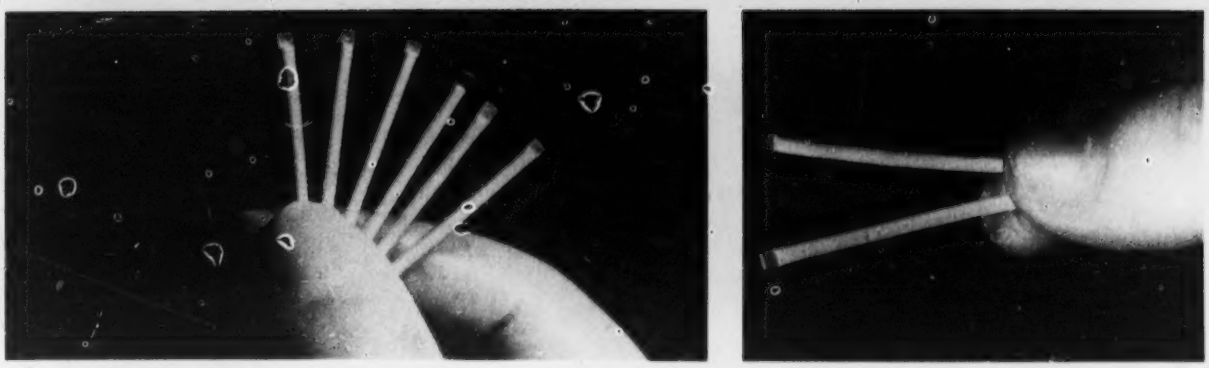
An Indonesian woman tells a friend about Norplant in this drawing from a pamphlet prepared for the Indonesian National Family Planning Coordinating Board (BKKBN) by PATH/PIACT.

Table 1. Characteristics and Status of Nonbiodegradable Implants as of March 1987

Delivery System	Development & Testing	Hormone	Duration of Action	Status of Animal Trials	Status of Human Trials			Estimated Availability
					Phase I	Phase II	Phase III	
Norplant (6 capsules)	Population Council	Levonorgestrel	5 years	Completed	Completed	Completed	Completed or underway in 31 countries in over 44,000 women[1]	Approved in Colombia, Dominican Republic, Ecuador, Finland, Indonesia, Sweden & Thailand. Widespread availability by early 1990s.
Norplant-2 (2 rods)	Population Council	Levonorgestrel	At least 3 years	Completed	Completed	Completed	Underway in 9 countries in 4,500 women	Approved in Finland. More approvals in late 1980s.
1 rod[2]	Population Council	ST-1435	2 years	Partially completed[3]	Completed	Completed[4]	Planned	Mid-1990s
1 rod[2]	Population Council, Organon International	3-keto desogestrel	2½–4 years	Completed	Completed	Underway in 3 countries	Planned	Early 1990s

Note: Phase I trials are conducted in small numbers of volunteers to determine how a drug is absorbed, metabolized, and excreted from the body and to determine tentatively delivery method and safe dosage. Phase II trials usually involve 20 to 50 volunteers for three months to assess safety and efficacy and to evaluate delivery method further. Phase III trials involve at least several hundred volunteers—and often thousands— for two years or more to confirm safety and efficacy.

[1]Some of these trials were not intended to meet requirements for regulatory approval.
[2]Trade name not yet chosen
[3]Trials ongoing in some animal species
[4]Phase II trials being repeated with modified delivery system



Population Council

Norplant implants release the progestin levonorgestrel. They are inserted just under the skin in the arm. The 6-capsule system (left) provides almost complete protection from pregnancy for five years. Norplant-2 (right), using two rods, is effective for at least three years.

and removals, training programs must emphasize the importance of sterile technique to prevent infection.

There are few contraindications to Norplant use. The implants are not recommended for women using medication to prevent blood clots or for women with active liver disease, jaundice, undiagnosed abnormal genital bleeding, or bleeding disorders (269). Norplant also is not currently recommended for breast-feeding women because few studies have looked at potential risks to nursing infants (191).

Effectiveness

Norplant provides almost complete protection against pregnancy. In the first five years of use of the Norplant 6-capsule system, the chances of pregnancy are less than one per 100 women per year (see Table 2). This rate is lower than for oral contraceptives, intrauterine devices, and barrier methods. Effectiveness decreases slightly after five years, and in the sixth year 2.5 to 3 percent of users conceive (18). Thus replacement after five years is recommended. A slight and gradual decrease in the daily release of levonorgestrel over time probably accounts for the increase in pregnancies after five years (168).

Ongoing international trials show that Norplant-2, the 2-rod system, is as effective as the 6-capsule system for the first three years of use (19, 115). It was expected that Norplant-2, like Norplant, would be effective for five years. After three years, however, an unexpectedly high number of pregnancies occurred in a large 5-country trial. The cumulative failure rates ranged between 5 and 6 percent at the various centers. As a result, the Population Council has asked clinical investigators in this study to remove Norplant-2 after three years (232). Other studies have reported few pregnancies so far, and most are continuing into the fourth year (232).

It is not yet clear why the pregnancy rate with Norplant-2 increased in the 5-country trial. Presumably, the release rate of progestin declined. The Population Council is conducting extensive laboratory tests to find the reasons for this.

Precisely how Norplant prevents pregnancy is not fully understood. Like other progestin-only contraceptives, Norplant implants appear to prevent pregnancy in several ways. Norplant suppresses ovulation in at least half of menstrual cycles (18). Hormonal indicators of ovarian activity suggest that ovulation may occur in some of the remaining cycles (49). Even if ovulation does occur, levonorgestrel makes cervical mucus thick and scanty, and sperm cannot easily pass through it into the uterus to fertilize ova (18, 269). Levonorgestrel also suppresses the

Advantages and Disadvantages of Norplant Implants

Advantages

- Norplant is highly effective.
- Once in place, the implants require no further action until removal.
- The 6-capsule system provides continuous protection for five years.
- The implants have no estrogen and thus no estrogen side effects.
- The contraceptive effect of the implants ends soon after they are removed.
- The implants release progestin at a fairly constant, low rate, avoiding the high initial dose typical of injectables and the daily surge of hormones with oral contraceptives.
- Norplant may help to prevent anemia.

Disadvantages

- Norplant must be inserted and removed by health professionals.
- Health workers need special training and practice to insert and remove implants.
- Norplant implants are initially more expensive than oral contraceptives and other short-term methods.
- Norplant often changes bleeding patterns.
- Women cannot discontinue use on their own.
- Some women may be reluctant to use an unfamiliar method.
- Implants may be visible.

Table 2. Performance of Norplant Implants, Selected Trials, Including Comparisons with IUDs, 1982–1986

Length of Follow-Up, Author, Date (Ref. No.)	Place	Device	No. of Women	Cumulative Net Termination Rates per 100 Women for: Pregnancy	Menstrual Problems	Infection	Other Medical	Expulsion	Non-medical	Continuation Rate
12 Months										
Lopez et al. 1986 (154)	Colombia	Norplant	389	0	6	<0.5	2	<0.5	1	92
Lubis et al. 1983 (155)	Indonesia	Norplant	813	1	2	<0.5	1	NA	1	95
Marangoni et al. 1983 (158)	Ecuador	Norplant	283	0	7[a]	1	3	0	1	87
		TCu 200	283	2	2[a,b]	1	1	4	2	88
Satayapan 1983 (211)	Thailand	Norplant	704	<0.5	4	2	3	NA	2	88
Shaaban et al. 1983 (221)[c]	Egypt	Norplant	250	1[d]	7[b]	0	1	0	2	90
		TCu 380A	100	1	6[b]	0	1	2	3	87
24 Months										
Affandi et al. 1984 (5)	Indonesia	Norplant	451	<0.5	4	<0.5	2	NA	2	92
Indian Council of Medical Research 1986 (115)[e]	India	Norplant	88	0	15	NA	NA	4	6[g]	77
		Norplant-2	84	0	20	NA	NA	6[f]	12[g]	66
Lopez et al. 1986 (154)	Colombia	Norplant	389	0	14	<0.5	<0.5	0	3	77
Shaaban & Salah 1984 (217)	Egypt	Norplant	250	1[d]	16	0	5	0	9	68
		TCu 380A	100	2	21[b]	0	9	3	13	52
36 Months										
Bardin et al. 1986 (19)	NA	Norplant	300	2	16	NA	11	NA	10	61
		Norplant-2	750	1	16	NA	10	NA	12	61
60 Months										
Affandi et al. 1987 (7)	Indonesia	Norplant	437	2	9	NA	4	0	7	78
Diaz et al. 1982 (56)	Chile	Norplant	101	0	10	NA	14	NA	22	54
Shaaban 1987 (216)	Egypt	Norplant	250	2	19	NA	7	0	14	58
Sivin 1984 (228)	Finland, Chile, Dominican Republic	Norplant	324	1	14	<0.5	14	NA	29	42

Note: Rates may not add to 100 due to rounding.

[a]Difference statistically significant
[b]Includes pelvic pain
[c]Rates calculated for nine months of use
[d]All pregnancies probably conceived before Norplant use
[e]Gross termination rates
[f]Local inflammation reported in 2 of 3 cases of expulsion
[g]Includes some medical

cyclic development of the endometrium in over 50 percent of Norplant users (51).

Menstrual Changes

Irregular menstrual bleeding is the most common side effect of Norplant. About 60 percent of women notice changes in their menstrual patterns in the first year after Norplant insertion (211, 233, 269). Most common are an increase in the number of days of bleeding and/or spotting per cycle and a decrease in the length of the menstrual cycle. For many women irregular bleeding decreases over time, however. Among 116 women who used the 6-capsule system for five years, the average number of days of bleeding and spotting per year gradually dropped from 92 in the first year of use (an average of seven days per cycle) to 70 in the fifth year (five per cycle) (19). Amenorrhea (absence of menstrual bleeding) is less common than prolonged bleeding or spotting, but in one multicenter study 25 percent of users did not menstruate for at least 90 days during the first year of use (233).

These menstrual changes have no apparent harmful effects. Although many women bleed more often than before, the volume of blood lost does not change (169). Heavy bleeding is quite rare (269). In fact, in four studies average hemoglobin levels increased significantly after Norplant insertion—a change that may help prevent anemia (94, 139, 221, 233). In three other studies average levels remained the same (155, 169, 210).

Reproductive Effects

No serious reproductive side effects have been reported among Norplant users. Transient ovarian cysts have been found in as many as 10 percent of users (56, 139). Some of these cysts have grown to 10 cm. Surgery to remove the cysts, removal of the implants, or other treatment is usu-

Implants should be gently inserted just beneath the surface of the skin. Inserting them too deeply makes removal difficult. (Courtesy of Kee Kee Minor, AVSC)

Inserting and Removing Norplant Implants

Inserting Norplant implants is a simple procedure. Removal is more difficult. With careful training and the supervision of an experienced practitioner, however, doctors, nurses, and other health workers can perform both procedures.

Insertion

Implants are inserted on the inside of the upper or lower arm 6 to 8 cm above or below the elbow. Inserted through a single incision, the six Norplant capsules form a fan shape, with its base toward the incision. Special care must be taken during insertion to place the implants just under the skin. If the implants are inserted too deeply, locating and removing them can be difficult. Maintaining sterile technique throughout the procedure is essential to prevent infection.

For the most part, only basic surgical equipment is needed: a table for the woman to lie on and a support for her arm, sterilized surgical cloths, sterile gloves without talc, soap, an antiseptic solution such as betadine, local anesthetic, a 4 to 4.5 cm anesthetic needle and syringe, scalpel, tweezers or mosquito forceps, butterfly skin closures, and sterile gauze and compresses. In addition, a specially marked #10 trocar is needed.

To insert Norplant implants:

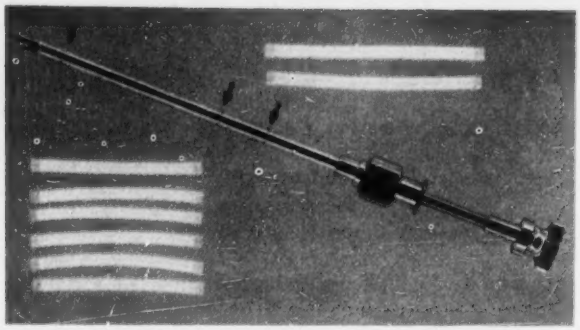
1. Wash the insertion area, apply antiseptic solution, and, if possible, cover the area below the arm with a sterile cloth.
2. Anesthetize the insertion area with local anesthetic, such as lidocaine 1%: inject a small amount into the incision area, then turn the needle and anesthesize the six or two areas, 4 to 4.5 cm long, where the implants will be inserted. Apply the anesthetic just beneath the skin. This raises the outer layer of skin from underlying tissue and makes insertion easier.
3. With the scalpel or the trocar, make a 2 mm incision parallel to the bend in the elbow.
4. Insert the tip of the trocar through the incision. The trocar is marked in two places—near the top and near the tip (see photo, p. K-63). Gently advance the trocar into the incision to the mark near the top of the trocar—about 4 to 4.5 cm. While advancing the trocar, keep upward pressure on it without changing the angle of insertion so that the implants will be inserted just below the skin.
5. Load the implant into the trocar. With the plunger, gently push the implant towards the tip of the trocar until you feel resistance. Then bring the trocar back, keeping the plunger stationary, until the mark close to the tip is visible in the incision and you feel the implant pop out of the trocar. Leave about 0.5 cm between the incision and the tips of the implants. Do not remove the trocar from the incision. Feel the arm to make sure the implant is in place.
6. Load the second implant into the trocar. To place the next implant, change the direction of the trocar so that the next implant will be angled 15 degrees from the first implant. Place your finger on top of the first implant. Advance the trocar alongside your finger to the mark near the top. Then release the implant under the skin by pulling back the trocar. Repeat the procedure until all implants are inserted.
7. After all the implants are inserted, apply pressure to the incision with sterile gauze to minimize bruising and to stop bleeding. Then press the edges of the incision together and close it with a butterfly closure. Sutures are not needed.
8. Cover the incision with a dry compress and wrap gauze around the arm to prevent bleeding. Tell the woman to keep the bandage clean and dry for four days (132, 144, 182, 191).

Removal

Removing the implants is usually more difficult than inserting them. Problems can occur if insertion was done improperly—that is, if the implant was placed too deep in the tissue—or when fibrous tissue has grown around the implants, as often happens. Practitioners should work gently, carefully, and patiently to avoid injuring the skin of the arm. Along with equipment used for insertion, mosquito and Crile forceps are needed for removal.

To remove the implants:

1. Wash the woman's arm and apply antiseptic. As during insertion, sterile technique is essential.
2. Locate the implants with your fingers. The locations of the implants can be marked with a pen.
3. Apply a small amount of local anesthetic *under* the half of the implants nearer the elbow. Applying anesthetic *over* the implants makes the skin swell and blocks your view of the implants.
4. Make one 4 mm incision as close as possible to the ends of all the implants, at the base of the "fan." This incision is long enough to remove all implants. A longer incision does not make removal easier.
5. Remove first the implant that is closest to the incision or closest to the surface.
6. Gently push the implant toward the incision until the tip is visible. Grasp the tip with the mosquito forceps. Scrape away the fibrous tissue around the implant with gauze or, if necessary, cut it with a scalpel. If you use a scalpel, be careful not to cut the end of the implant. Grasp the implant with the Crile forceps and remove it.
7. If you cannot push the implant into the incision, insert closed forceps into the incision and gently dissect the tissues around the implant. At the same time push the implant toward the incision with your other hand.
8. Apply more anesthetic as needed to remove the other implants.
9. If the woman does not want a new set of implants, close and bandage the incision as you would after insertion. If she does want a new set, it can be inserted immediately (see p. K-59).
10. If an implant cannot be removed, the woman should return to the clinic in about two to four weeks. Removing the remaining implant or implants is easier when the arm has healed (6, 144, 182, 191). Of course, the woman should receive another contraceptive method to prevent pregnancy until she returns.



Inserting Norplant requires only simple instruments, including a specially marked trocar (see arrows). After a small incision is made in the skin, the trocar is inserted just under the skin up to one of the marks away from the tip—the middle mark for Norplant, the upper mark for the longer Norplant-2. Then the plunger is held in place and the sleeve withdrawn until the mark near the tip shows and the implant pops out of the trocar. Sterile technique is essential throughout the insertion procedure.

ally not needed, however, since the cysts regress spontaneously within six weeks (18, 19).

Concerns have been raised about an increased risk of ectopic pregnancy among Norplant users. These concerns arise because higher than expected rates of ectopic pregnancy have been reported among women using progestin-only oral contraceptives (30, 32, 152, 238). As of January 1987, in studies of Norplant and Norplant-2 conducted by the International Committee for Contraception Research, 10 ectopic pregnancies had been reported in 6,800 woman-years of use, for a rate of 1.5 per 1,000 woman-years (232). This is about the same as the rate among women using copper and unmedicated intrauterine devices (IUDs), excluding the Dalkon Shield, and probably does not represent an increased risk for Norplant users. The rate is lower than the rate among women using no contraception (231, 256). Certainly, any pregnancy during Norplant use is rare.

The contraceptive effect of Norplant wears off quickly once the implants are removed. Former users of Norplant conceive as rapidly as women who have not used contraception. Among 95 women seeking to become pregnant, 50 percent conceived by three months after discontinuation, and 86 percent, by one year (232).

Preliminary evidence suggests that the small amount of levonorgestrel released by Norplant has no harmful effects on infants exposed during pregnancy or breast-feeding. To date, researchers have followed up 15 full-term pregnancies conceived during Norplant use. All pregnancies were normal, and the children, healthy (232). This number would be too small to detect most birth defects, of course, and follow-up is too short to detect any possible long-term effects.

In Chile and Indonesia researchers have compared breast-feeding infants of mothers who used Norplant with infants of mothers who used copper-T IUDS. In Chile there was no difference between the two groups in the percentages receiving supplementary bottle-feeding in the first six months postpartum, in the percentages still breast-feeding at 12 months, or in average monthly weight gain. Infant daughters of Norplant users gained less weight than daughters of IUD users, but weight gain for all children was within the normal range (55). The study is continuing; researchers will look for any long-term effects (232). In Indonesia both groups of infants grew satisfactorily in weight and length over six months. In fact, the Norplant infants gained weight slightly but significantly faster (4).

Norplant use during breast-feeding does not alter hormone levels in infants. Serum levels of immunoglobulins and urinary levels of follicle-stimulating hormone (FSH), luteinizing hormone (LH), and testosterone are the same in breast-fed infants of women using Norplant and of women using barrier methods or no contraception (1, 114).

Other Side Effects

Norplant causes few side effects apart from menstrual changes. Headache is the most common other complaint (154, 221, 229, 235). In one study Norplant users reported more headaches than IUD users (229). In another, however, rates were the same (221).

Norplant causes few systemic changes. Lipid metabolism is especially important because of its link with cardiovascular disease. Six studies to date have reported conflicting results (50, 94, 105, 210, 218, 279). Other clinical indicators are reassuring. Only minor changes—all within the normal range—have been observed in liver function (48, 50, 94, 210, 220), carbohydrate metabolism (50, 94, 269), blood coagulation (219), blood pressure (139, 155, 210, 220), immunoglobulins (1, 269), serum cortisol (21), urea nitrogen, uric acid, sodium, potassium, calcium, inorganic phosphorous (48, 50, 269), and body weight (139, 155, 221, 235).

Care of Equipment for Norplant Insertion and Removal

Special care should be taken with the equipment used during Norplant insertion and removal. The trocar should be washed with warm water and antiseptic solution immediately after each insertion and then disinfected before reuse. The equipment can be disinfected by several methods:

- autoclave for 20 minutes,
- immerse in boiling water for 5 to 10 minutes, or
- cold-sterilize with standard hospital-strength germicide for at least one hour.

Autoclaving is the most effective disinfection method. All three methods will kill human immunodeficiency virus (HIV), the virus that causes AIDS (68). Neither cold sterilization nor boiling in water for 5 to 10 minutes kills hepatitis B virus, however. Where hepatitis is endemic, instruments should be autoclaved or boiled in water for 15 to 30 minutes.

The tip of the trocar becomes blunt after repeated use, and this makes it harder to advance the trocar into the incision. Health workers should examine the tip of the trocar after every 10 insertions and sharpen it as needed (188). With proper care a trocar can be used for about 50 insertions (124). If incisions are made with the trocar, it may need sharpening more often and may not be usable for 50 insertions.

Continuation

Over two-thirds of women use Norplant implants for at least two years. After one year, continuation rates range from 87 to 95 percent, and after two years, from 66 to 92 percent (see Table 2). In a multicenter Indonesian field study involving more than 8,600 women, after 12 months 95 percent of the urban participants and 98 percent of the rural participants were still using Norplant; at 18 months, 92 and 98 percent (277). According to smaller studies in Chile, the Dominican Republic, Egypt, Finland, and Indonesia, after five years 42 to 78 percent of users were still relying on implants (56, 228). Bleeding irregularity is the most frequent reason for discontinuation, causing 2 to 7 percent of women to stop using implants in the first year (see Table 2). This is lower than discontinuation rates for bleeding problems with long-acting injectables (see p. K-72). The greater difficulty of discontinuing Norplant may help account for the difference in discontinuation rates.

The long effectiveness and ease of use of Norplant are among its most attractive features. In Thailand, for example, 31 percent of 700 women reported that five years of effectiveness was the major reason that they chose Norplant over other methods (211). Focus-group discussions among Norplant users in the Dominican Republic, Ecuador, Indonesia, Kenya, the Philippines, Sri Lanka, and Thailand identified other desirable features of the method as well: not having to put anything into the vagina, not having to do anything just before intercourse, reversibility, and the possibility of slight weight gain (a much less common side effect than menstrual irregularity), which most women considered a sign of good health (184, 274).

Use of Norplant

Data on use of the 6-capsule Norplant system are available for only four of the seven countries where it has been approved; the other three countries have granted approval only recently. In Indonesia Norplant is available through the Indonesian family planning program at more than 150 locations, mostly in Java. The Indonesian National Family Planning Coordinating Board (BKKBN) buys Norplant directly from the manufacturer using grant funds from the United Nations Fund for Population Activities (UNFPA) and loan funds from the World Bank (276). About 18,000 Indonesian women chose Norplant in preintroductory trials. Between approval in 1986 and January 1987 an additional 57,000 women adopted the method (85). In Thailand almost 7,000 women are using Norplant (85); in Finland about 9,000; in Sweden about 10,000 (124).

At a follow-up visit to a clinic in Brazil, a Norplant user lets other clients see that implants hardly show. (Population Council)

UNFPA is the only donor agency currently supplying Norplant to developing countries. In 1985 UNFPA shipped 12,000 sets of Norplant implants, mainly to India and the Dominican Republic. In 1986 about 38,000 sets were shipped to four countries—India, Thailand, Tunisia, and Nigeria. Shipments to India were the 2-rod Norplant-2 system for clinical trials. All other shipments were 6-capsule Norplant (245). The International Planned Parenthood Federation (IPPF) has approved Norplant for distribution to its 120 affiliated family planning associations if the countries have granted regulatory approval and if health workers have been trained.

More Nonbiodegradable Implants Being Developed

In addition to levonorgestrel, which is used in Norplant, at least 10 compounds have been tested in nonbiodegradable implants (150). Most have proved unsuitable for contraception or for delivery in implants. Several are promising, however, and clinical trials are underway (see Table 1). As of March 1987, no application had been filed with the US Food and Drug Administration (US FDA) for testing or approval for these products. The most advanced is an implant containing desogestrel, a new progestin used for several years in some oral contraceptives. The pharmaceutical firm Organon International and the Population Council are conducting clinical trials with the main metabolite of desogestrel, 3-keto desogestrel. Different lengths of a single rod are being tested in Chile and Sweden to determine release rates and duration of action (168). In addition, trials with single rods releasing about 15 μg or 30 μg per day are being conducted in China (173). The rod can be inserted in the inside or outside of the upper or lower arm. Organon International plans to develop implants with varying amounts of hormone so that a single rod will prevent pregnancy for two, three, or four years (173).

Another progestin, ST-1435, also is being used in implants (47). In recent clinical trials one capsule with 20 to 40 mg ST-1435 suppressed ovulation and prevented pregnancy in 28 women for six months (140, 141). Like Norplant and other progestin-only contraceptives, the ST-1435 implant causes irregular bleeding. Amenorrhea occurs more often with ST-1435 than with Norplant. Almost 60 percent of the 28 women did not menstruate for at least 90 days over a 12-month period. Because ST-1435 diffuses fairly rapidly through the implant membrane, a single capsule may have to be replaced every 6 to 12 months (140). The Population Council is developing a single rod implant expected to release hormones at a constant rate for two years. The organization plans to submit an application to US FDA for permission to test this implant (168).

BIODEGRADABLE IMPLANTS

Biodegradable implants deliver progestins from a carrier that gradually dissolves in body tissues. Thus the carrier never has to be removed, as with Norplant implants. Once the carrier begins to dissolve, however, it cannot be removed.

Two implants now being tested in women are:

- a polymer capsule filled with the progestin levonorgestrel and
- pellets consisting of the progestin norethindrone and small amounts of cholesterol.

Preliminary results indicate that both implants are safe and effective. Both may be available by the mid-1990s.

Capronor

Capronor, developed by the Research Triangle Institute, consists of a biodegradable capsule made of the polymer poly(ε-caprolactone) containing the progestin levonorgestrel. Current trials involve capsules that are less than 0.24 cm in diameter and either 2.5 cm or 4 cm long (202, 260). The shorter capsule contains 16 mg levonorgestrel. The longer capsule contains 26 mg levonorgestrel. In both capsules the levonorgestrel is suspended in an oily solution of ethyl oleate (97). Studies in rabbits and monkeys suggest that contraceptive protection will last at least 18 months and probably longer (260). The polymer carrier remains largely intact for 18 to 24 months and can be removed easily during that time. Then it begins to biodegrade. It is not completely absorbed for several years (260).

The first clinical trials of Capronor in women began in 1980 (202). A 2.5 cm long device releasing an average of 20 μg levonorgestrel per day suppressed ovulation in 22 of 26 women during one menstrual cycle. A 4 cm device releasing 30 to 50 μg levonorgestrel daily prevented ovulation in all 10 women using it (260). Recruiting for Phase II trials (preliminary effectiveness trials) comparing the 2.5 and 4 cm devices began in early 1987. Conducted by the US National Institute of Child Health and Human Development (US NICHD), the World Health Organization (WHO), and the Indian Council of Medical Research (ICMR), the trials will enroll between 250 and 300 women for one year (97).

Few side effects have been reported in the small, preliminary trials of Capronor. None of eight women in a US study reported bleeding between menstrual periods. The average length of the menstrual cycle was about four days shorter than before the device was inserted. No changes in blood pressure, lipids, or blood chemistry were observed (174).

Capronor is inserted under the skin in the hip or upper arm. The area is first numbed with a local anesthetic. A small incision is made in the skin, and the capsule is inserted through a special inserter (see photo, p. K-66). The polymer capsule does not cause inflammation at the insertion site (174).

Norethindrone Pellets

Small pellets are another type of biodegradable implant. The pellets were developed by Gopi Gupta while working at the Population Council (90). They are made of 15 percent pure cholesterol and 85 percent norethindrone (NET). Each pellet contains about 35 mg NET, which is released as the pellets gradually biodegrade. The pellets are quite small, each a little larger than a grain of rice. After insertion they are barely visible under the skin (226).

Preliminary trials using two, three, and four pellets have been conducted in over 100 women in four countries. With all three regimens the release of hormone was fairly constant (198, 226). The daily dose of NET and contraceptive effectiveness increased with the number of pellets:

Hormone Release Rates and Numbers of Pregnancies with Two, Three, and Four NET Pellets

No. of Pellets	Mean Daily Release (μg)	No. of Women	No. of Pregnancies
2	111 ± 20	50	3 at 6 months
3	150 ± 7	51	2 at 12 months
4	213 ± 9	30	0 at 12 months

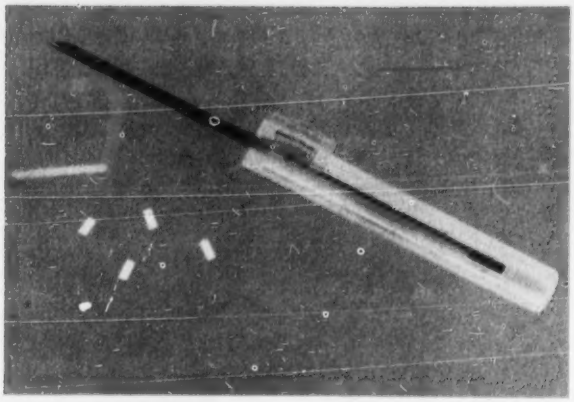
Source: PARFR (197, 198), Singh et al. (226)

The 4-pellet regimen appears to provide a high level of protection against pregnancy for at least 12 months. Thus further research will focus on this regimen.

More than half of the women using three or four NET pellets experienced irregular menstrual patterns. Intermenstrual bleeding or spotting was the most common problem. In time bleeding returned to preinsertion patterns, however. For example, among women using the 4-pellet regimen, the percentage experiencing more than five days of bleeding or spotting per menstrual cycle was 40 percent before insertion, 70 percent in the first month after insertion, and 43 percent in the sixth month after insertion (197, 198). Amenorrhea occurred in 14 percent of women by six months. The pellets relieved moderate and severe menstrual pain in most women who had experienced it previously (197, 226).

Table 3. Characteristics and Status of Biodegradable Implants as of March 1987

Delivery System	Development & Testing	Hormone	Duration of Action	Status of Animal Trials	Status of Human Trials			Estimated Availability
					Phase I	Phase II	Phase III	
Capronor (poly (ε-caprolactone) capsule)	Research Triangle Institute	Levonorgestrel	At least 18 months	Completed	Completed	To begin in 1987 in 6 countries with 250–300 women		Mid-1990s
Pellets	Population Council; Endocon, Inc.	Norethindrone	1 year	Completed	Completed using 2 pellets	Completed in 3 countries with 81 women using 3 or 4 pellets		Mid-1990s



Capronor (long capsule at left) and contraceptive pellets are both long-acting implants that dissolve in body tissue and do not need to be removed. The special inserter can be used with either.

Few women reported side effects other than irregular bleeding. Breast pain or discharge occurred in three women (4 percent). The very small amount of cholesterol in each pellet—less than 2 percent of the cholesterol in a single chicken egg—did not affect serum cholesterol levels in any of the women (198).

The pellets are inserted in the inner side of the upper arm. The insertion procedure is like that used with Capronor and can use the same inserter. After the area is numbed with local anesthetic, a 3 mm incision is made. The pellets are inserted about 3 cm under the skin. Sutures are not needed, and the wound is covered with a bandage. If the pellets are to be removed before they biodegrade, a 5 mm incision is needed. In preliminary trials pellets broke in about 5 percent of both insertions and removals. The broken pieces were not difficult to remove, however. When researchers removed pellets, they noted that fibrous tissue had developed around the pellets in most women. This had not caused any inflammation or discomfort, however, and had not interfered with release of NET (197, 198).

Plans are being made to conduct larger clinical trials with the 4-pellet regimen. A manufacturing process is being developed so that the pellets can be produced easily and inexpensively on a large scale (79, 224).

INJECTABLE MICROSPHERES AND MICROCAPSULES

Injectable microspheres and microcapsules consist of a biodegradable copolymer and one or more hormones. The many microspheres or capsules release hormones at varying rates to achieve a fairly constant daily dose, like that of implants. Depending on the formulation, a single injection of microspheres, suspended in a sterile solution, can provide contraception for one, three, or six months. Like other injectables (see pp. K-69–76), microspheres and capsules are easy to administer but, once administered, cannot be removed.

The microspheres and capsules being studied use the carrier poly(dl-lactide-co-glycolide). The polymers in this carrier have been used safely for years in biodegradable surgical sutures (25). Progestins and other hormones can be dispersed in the polymeric particle (microsphere) or contained in the core of the particle (microcapsule) (23, 147). With both systems hormone is released first by leaching or by diffusion through the carrier and later by erosion of the carrier.

The size of microspheres or capsules and the amount of hormone they contain, as well as their quantity, largely determine the daily dose of hormone. Smaller particles release hormone faster and so have a shorter duration of action. Among particles of the same size, those with more hormone and less carrier release hormone faster (25, 92). A 3-month dose of injectable norethindrone microspheres usually contains particles consisting of 50 percent hormone and ranging in size from .06 to 0.1 mm in diameter (24). Sterilization of microspheres or capsules by gamma radiation slightly increases hormone release (92).

For an injection, microspheres are loaded into a syringe. Then a sterile suspension fluid is drawn into the syringe. A 3-month formulation of norethindrone microspheres, for example, contains about 2½ cc of fluid and is injected into the buttocks with a 21 gauge needle (22) (see photo, p. K-68). The syringe must be shaken just before an injection. This prevents the larger, heavier spheres from pooling at the bottom of the syringe (205). Earlier formulations composed of 80 percent polymer and 20 percent hormone were very dense, and researchers were not always able to inject all the microspheres (24). Microspheres of half polymer and half hormone have eliminated this problem, decreased the amount of material injected, and reduced discomfort from the injection (22).

In addition to contraception, microspheres are being used to deliver drugs to treat medical conditions. In the US, for example, a small trial is underway studying testosterone microspheres in men with abnormally low production of testosterone (146). In Europe several pharmaceutical companies are testing microspheres containing luteinizing hormone releasing hormone (LHRH) antagonists to treat endometriosis and prostate cancer (22). Microspheres with natural estrogen are now being tested in animals. These microspheres could provide estrogen replacement therapy for postmenopausal women (22).

For contraception in women, injectable microspheres are being tested with various hormones (see Table 4). Most promising are microspheres with either norethindrone or a new progestin, norgestimate. Microspheres also are being considered for male contraception. Possible formulations are testosterone alone or testosterone combined with LHRH analogues (146, 280).

Norethindrone Microspheres

Injectable microspheres containing norethindrone (NET) have been tested in almost 200 women. Results are promising. In short-term clinical trials different formulations of 3-month injections have prevented pregnancy and caused very few side effects other than menstrual irregularities. Norethindrone microspheres were developed by Lee Beck and Danny Lewis of the Stolle Research and Development Corporation with support from the Program for Applied Research in Fertility Regulation (PARFR). Family Health International is conducting larger clinical trials in four countries to test two formulations of a 3-month injection—with 65 and 100 mg NET. Trials of the 65 mg injection in about 1,200 women have been approved by the US Food and Drug Administration and will begin in 1987 (22, 44).

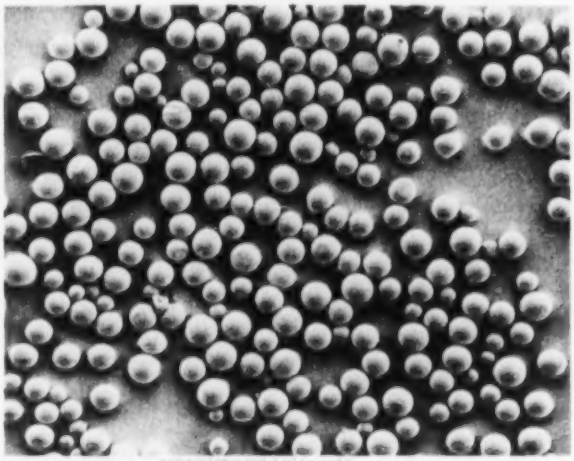
NET microspheres prevent pregnancy with doses comparable to those in combined oral contraceptives. A 3-month injection containing a total of 75 mg NET releases on average 0.48 mg NET per day. A 3-month injection containing 100 mg NET releases 0.66 mg per day (26). By comparison, the daily dose of NET used in some combined oral contraceptives ranges from 0.5 to 1 mg in various formulations (102). In initial trials none of the 10 women receiving the 75 or 100 mg 3-month injections ovulated during treatment (26). In the second phase of trials, after more than 300 woman-months of observation, one pregnancy has occurred among 60 women receiving 65 mg injections. None has occurred among 65 women receiving 100 mg injections (44).

A 6-month injection with 200 mg NET looks less promising. When it was tested in 10 women, there were no pregnancies during the 24-week period, but 2 of 10 women appeared to ovulate before six months, and one woman conceived 26 weeks after the injection (205).

Irregular menstrual bleeding is the only common side effect of NET microspheres. Amenorrhea or long cycles with persistent spotting are the most common patterns (205). Among 10 women each receiving a 3-month injection, the total number of days per cycle with bleeding or spotting ranged from 5 to 9 with the 75 mg injection and from 8 to 11 with the 100 mg injection (24, 26).

Other side effects are rare. Among 115 women, only a few complained of mild headaches or nausea, and it is not clear that these were caused by the injection (44, 206). There have been no infections at the injection site. No changes have been observed in blood pressure, hemoglobin, serum lipoproteins, triglycerides, or glucose metabolism (24, 44). The contraceptive effect of the microspheres wears off rapidly. Most women ovulate within two months after the end of the 3- or 6-month injection interval (44, 205).

Other formulations of NET microspheres are being studied. A one-month injection with 15 or 30 mg NET has been tested in about 30 women in Mexico. Also, animal studies have been completed with various formulations of one- and three-month injections of NET and the synthetic estrogen ethinyl estradiol. In animals these formulations caused very little irregular bleeding and very slight endo-



In clinical trials norethindrone microspheres prevent pregnancy for three months. Microspheres are .06 to 0.1 mm in diameter. The smaller microspheres release hormone faster. (Stolle Research Corporation)

Table 4. Characteristics and Status of Injectable Microsphere and Microcapsule Contraceptives as of March 1987

Hormone	Development & Testing	Duration of Action	Status of Animal Trials	Status of Human Trials			Estimated Availability
				Phase I	Phase II	Phase III	
Norethindrone (microspheres)	Stolle Research & Development Corporation, Family Health International	3 months	Completed	Completed	Underway at 8 sites in US, Mexico, Chile & Italy with 65 & 100 mg formulations in 160 women	Planned for 1987 with 65 mg formulation in 1,200 women	Early 1990s
		6 months	Completed	Completed in Mexico & US with 200 mg formulation			No sooner than late 1990s
		1 month	Completed	Completed in Mexico with 15 mg & 30 mg formulations in 30 women			Mid-1990s
Norgestimate (microcapsules)	Ortho Pharmaceutical, Contraceptive Research & Development (CONRAD)	3 months	Completed	Underway in US with 50 mg formulation			Mid-1990s
Progesterone (microcapsules)	Stolle Research & Development Corporation	3 months	Completed	Underway in Chile & US			No sooner than late 1990s
Levonorgestrel (microspheres)	Stolle Research & Development Corporation	3 months	Completed	Approved to begin in US			No sooner than late 1990s
Norethindrone (NET) & ethinyl estradiol (EE) (microspheres)	Stolle Research & Development Corporation	3 months	Completed	Approved to begin in US with 30 mg NET & 5 mg EE			No sooner than late 1990s

metrial changes. This suggests that the combined injection may cause less irregular bleeding in women than NET injections alone. Initial trials in women of a 3-month injection have been approved and are planned for 1987. This injection will contain about 30 mg NET and about 1.3 mg ethinyl estradiol (22).

Microcapsules with Various Other Hormones

Research is underway on microcapsules containing other hormones. Animal studies with Ortho Pharmaceutical's new progestin, norgestimate, suggest that it will cause less spotting than other progestins. In six baboons microcapsules containing 50 mg norgestimate suppressed ovulation for 90 to 120 days (92, 93). Endometrial biopsies on these animals showed hormonal effects like those occurring naturally in the postovulatory phase of the menstrual cycle (257). Spotting did not occur in any of the animals (92, 93). Thus norgestimate may cause less irregular bleeding in women than other progestins that have a more marked effect on the endometrium. Norgestimate is a more potent progestin than NET and has no androgenic side effects such as hair growth and acne (93). Therefore it is likely to be highly effective and also popular with women. Initial trials of a 3-month injection with 50 mg norgestimate are underway in the US (91).

Preliminary trials of microcapsules containing the natural hormone progesterone were carried out in 1986 in Chile and the US (146). Progesterone microcapsules are intended specifically as a contraceptive for lactating women to eliminate any possible effects of synthetic progestins on breast milk production or composition or on the nursing infant. The trials involved about 10 women receiving a 3-month injection with 275 mg progesterone (146). This dose appears high compared with other microsphere and microcapsule formulations because progesterone is less potent than synthetic hormones. Preliminary results showed that the microcapsules release a smaller than expected amount of progesterone per day. Plans are underway to increase the progesterone in the microcapsules so that the daily release rate will be about 20 percent higher. Initial trials of the modified microcapsules are planned for 1987. Another way to deliver progesterone that is being considered is an injection of a micronized preparation of pure progesterone—that is, a crystalline form ground to a fine powder. One injection would be effective for a month.

Norethindrone microspheres offer the convenience of an injection without the large initial burst of hormone that occurs with currently available injectables. For clinical trials microspheres are supplied in a sterile syringe. Fluid is drawn from the vial, and the syringe is shaken just before the injection is given.

In China researchers have been testing monthly injections of microcapsules containing various doses of the progestin megestrol acetate and the estrogen estradiol valerate. The fewest side effects occurred with a monthly dose of 15 mg megestrol acetate and 5 mg estradiol valerate. With this regimen the pregnancy rate was 1.1 per 100 woman-years in a study involving 434 women. Spotting occurred in only 3 percent of menstrual cycles, and only 9 percent of cycles were either longer than 36 days or shorter than 20 days (100).

VAGINAL RINGS

Vaginal rings are different from the other new long-acting hormonal methods. Although, like the others, they slowly release hormone, vaginal rings are not injected or placed under the skin. Instead, a woman simply places the ring in her vagina and leaves it there. She can remove it at any time.

Levonorgestrel Rings

Research is most advanced on a ring developed by the World Health Organization (WHO) that releases about 20 µg levonorgestrel per day. This ring is designed to stay in the vagina for three months. It consists of an inner core containing 6 mg levonorgestrel mixed with Silastic and an outer shell of Silastic alone. The ring's overall diameter is 55.6 mm; its cross-sectional diameter, 9.5 mm. The ring prevents ovulation in at least half of cycles (292, 302) and also thickens cervical mucus, preventing sperm from entering the uterus (272).

The levonorgestrel ring is less effective than implants or injectables. In a multicenter one-year trial involving about 1,000 women, there were 25 pregnancies, for a rate of 3.5 per 100 woman-years (260). Like other progestin-only methods, vaginal rings cause irregular bleeding, and this accounted for most discontinuations. About 8 percent of the women stopped using the ring because of vaginal discharge, irritation, or infection, and about 4 percent, because of expulsion. Expulsion is most likely when women squat to defecate (97).

WHO has applied for approval of the levonorgestrel ring in the UK. Approval is being postponed until machinery for manufacturing the rings is completed and the manufactured rings are shown to release levonorgestrel at the same rate as the handmade rings. The manufacturing process should be final by late 1987. Approval is expected in 1988 (97).

Progesterone Ring

Another ring contains the natural hormone progesterone. It is designed especially for breast-feeding women so that they will not be exposed to synthetic hormones that might affect the composition or quantity of breast milk. Like the levonorgestrel ring, the progesterone ring can remain in the vagina for three months. Currently, WHO and the Population Council are testing rings releasing 5 or 10 mg progesterone per day (260). According to a small study in Chile, growth of infants and duration of breast-feeding were very similar when infants of women using the rings or TCu-200 IUDs were compared. Bleeding and/or spotting

Table 5. Characteristics and Status of Vaginal Rings as of March 1987

Hormone	Development & Testing	Duration of Action	Status of Animal Trials	Status of Human Trials			Estimated Availability
				Phase I	Phase II	Phase III	
Levonorgestrel	WHO HRP	3 months	Completed	Completed	Completed	Completed	Approval in UK pending, expected in 1988
Progesterone	WHO HRP, Population Council	3 months	Completed	Completed	Ongoing		Early 1990s

WHO HRP = World Health Organization Human Reproduction Program

for more than six days per 30-day interval occurred more often among the IUD users (55).

Combined Progestin-Estrogen Rings

The Population Council is working on several rings that deliver both progestins and estrogens. These rings are intended to be kept in the vagina for three weeks at a time and removed for one week to allow monthly bleeding. Preliminary studies in about 10 women showed that a ring releasing 400 µg norethindrone acetate and 40 µg ethinyl estradiol daily stopped ovulation in all women and caused very little irregular bleeding. This ring is now being changed to reduce the daily release of ethinyl estradiol. Human trials of the new version are planned for 1987. The Population Council also plans to test vaginal rings with two other progestins, ST-1435 and levonorgestrel acetate, alone and combined with ethinyl estradiol (168).

Advantages and Disadvantages

To date, few women have tried vaginal rings. Thus, as with many of the other new methods, it is not clear how popular they will be. In a British trial 26 of 27 women using the levonorgestrel ring said that they preferred it to oral contraceptives, condoms, and the diaphragm, primarily because it was so easy to use (293). Earlier trials in eight countries found that discontinuation rates were similar for oral contraceptives and a ring of levonorgestrel and ethinyl estradiol. Significantly more discontinuations among ring users were for method-related problems, however, especially difficulties or "unpleasantness" with inserting or removing the ring (297).

Two vaginal rings (shown actual size) release hormone for 3 months. The upper ring contains norgestrel; the lower, progesterone.

Compared with the other new long-acting methods, the big advantage of the vaginal ring is that a woman can put it in and take it out herself. This means that she can start and stop the method easily, without help from a health worker. It also means that rings can be distributed through commercial channels and community-based distribution programs more easily than some of the other new methods.

Unlike barrier methods, vaginal rings do not have to be inserted just before intercourse. In fact, they will not work if used only during intercourse. A woman can remove the ring before intercourse, however. In early trials one-fourth of users removed the rings at least some of the time, often because their partners could feel them (286, 297). Removing the ring for a short period—as long as 2 hours for the progesterone ring and possibly as long as 24 hours for the levonorgestrel ring—will not decrease effectiveness (168). Leaving them out longer may increase the risk of pregnancy (55, 97).

The vaginal rings appear to have several possible disadvantages. Women who dislike touching their genitals may not like inserting and removing the rings, as earlier studies indicated. Also, the preliminary data on the current version of the levonorgestrel ring suggest that it is less effective than other hormonal methods, voluntary sterilization, or the more effective IUDs.

LONG-ACTING INJECTABLES

Two long-acting injectables are widely available—depot medroxyprogesterone acetate (DMPA; trade name Depo-Provera; the Upjohn Company) and norethindrone enanthate (NET EN; trade name Noristerat; Schering AG). Both are highly effective, reversible methods. DMPA is approved for use as a contraceptive in more than 90 countries; NET EN, in more than 40. Although injectables have proved very popular, controversies—particularly about DMPA—have limited their availability in some areas. Questions have been raised about long-term health risks, especially cancer, but new studies are for the most part reassuring. Some questions concerning cancer remain, however. Research continues on both injectables.

The synthetic hormones used in both injectables were developed in the 1950s. The progestin medroxyprogester-

New Leaders in Contraceptive Research and Development

The leading roles in contraceptive research and development are changing. For a combination of reasons, some pharmaceutical companies are increasingly reluctant to initiate contraceptive research and development. More and more, nonprofit organizations and government agencies are taking the lead, and pharmaceutical companies are collaborating with them. Regardless of who takes the lead, however, developing a new drug remains a long, complex, and costly process.

Drug Regulation

Over the last several decades the process of contraceptive testing has become increasingly standardized to meet the requirements of government drug regulations. Many countries require specific series of animal and human tests to establish safety and efficacy before a drug can be made available (118). Often these requirements are modeled on those of the US Food and Drug Administration (US FDA). The US FDA requires that steroid contraceptives be tested in three animal species—rats for 2 years, beagle dogs for 7 years, and monkeys for 10 years. Human trials are usually carried out in three phases with increasing numbers of volunteers (see note, Table 1, p. K-59). Human trials can start and progress from one phase to the next only after animal trials have successfully reached certain stages.

While adequate testing is essential, the cost and time spent on the tests now required has helped discourage pharmaceutical manufacturers from developing new contraceptives. A 7-year dog study or a 10-year monkey study can cost between $500,000 and $2 million (US) (60). The annual cost of early, Phase I human trials in the US is about $10,000 per person (31). Furthermore, the lengthy research and development process limits profits. In the US, for instance, patents now protect new compounds for 22 years. If most of those years are taken up in testing, little time is left for exclusive marketing. In hopes of shortening testing, many developers are focusing on new delivery systems for compounds already approved—for example, the compounds now used in oral contraceptives. Also, most new contraceptives are intended for international distribution. Thus researchers must meet the differing regulations governing clinical trials in many different countries (95, 118, 160). This, too, adds to costs.

Other Impediments

Concerns over legal liability and insurance costs, especially in the US, also have discouraged some pharmaceutical manufacturers. For example, in 1986 the G.D. Searle Company withdrew the Cu-7 IUD from the market because responding to a mounting number of law suits, even though the company usually won, was very costly. Today, only one IUD, the Progestasert, is still marketed in the US even though IUDs are a safe and effective contraceptive method. Also in 1986, the US Supreme Court affirmed an award of $4.7 million (US) for a birth defect allegedly caused by spermicidal jelly—even though the weight of scientific evidence showed that the spermicide was not to blame. Manufacturers cannot afford to risk the high cost of law suits—win or lose—over a product that generates little profit. Contraceptives may generate little profit if the amount of sales is small, as with spermicides, or if the method is low-cost and long-acting, as with IUDs.

Also in the US, contraceptive developers are having difficulty finding product liability insurance. As a result, clinical testing in the US sometimes must be delayed for several years, as in the case of the biodegradable implant Capronor, or held to the minimum required by the US FDA, as in the case of Norplant (8, 15).

Even when the required testing is finished, political controversy can delay regulatory approval. Some opponents of DMPA have made a political issue of fears that women would be given injectables without their knowledge or full understanding. Controversy over this issue lengthened US FDA deliberations over Depo-Provera and delayed approval in the UK until 1984 (196).

The Role of Nonprofit Organizations

While interest declines among pharmaceutical manufacturers, a handful of nonprofit organizations are emphasizing contraceptive research and development. In 1985 eight such organizations spent more than $30 million (US) working on 23 new products (15).

Nonprofit organizations currently involved in contraceptive research include the Human Reproduction Program of the World Health Organization (WHO); government agencies, such as the Center for Population Research of the US National Institute of Child Health and Human Development (US NICHD) and the Indian Council of Medical Research (ICMR); and private research organizations usually receiving both public and private funds, such as the Contraceptive Research and Development Project (CONRAD), the Population Council, and Family Health International (FHI). Many of these organizations receive support from the US Agency for International Development. These organizations often collaborate with each other, with the pharmaceutical industry, and with other independent research institutions such as university centers (16).

Nonprofit research organizations face the same problems as pharmaceutical manufacturers in meeting national regulations and obtaining US liability insurance. In addition, because they often have small budgets and no distribution systems, nonprofit organizations must develop and maintain close working relationships with governments and manufacturers.

Calls are increasing for a simplified, more flexible approach to drug regulation (53, 142, 252). In early 1987 WHO convened a meeting to discuss new guidelines for toxicological studies of steroidal contraceptives. The draft guidelines stress a flexible approach, in which the characteristics of the drug govern the design of animal studies and clinical trials. They also stress the need for systematic, long-term postmarketing surveillance. WHO has been invited to present the proposed guidelines to US FDA. Meanwhile, reform of liability insurance in the US is being proposed (8, 244). Until such changes are made, however, new methods of contraception will still take many years to reach the public.

one acetate (MPA), the hormone in DMPA, is derived from the natural hormone progesterone. DMPA is prepared in a microcrystalline suspension. Thus the hormone is not absorbed immediately after an injection. The usual dose of DMPA is 150 mg every three months. Six-month regimens of 250 to 450 mg DMPA are less widely used. The progestin NET EN is derived from testosterone. NET EN is prepared in an oily solution. A 200 mg injection is effective for up to 12 weeks.

Effectiveness

Both DMPA and NET EN are highly effective contraceptives. With the standard regimens, pregnancy rates are usually lower than one per 100 woman-years for DMPA and two per 100 woman-years for NET-EN (see **Population Reports,** *Long-Acting Progestins—Promise and Prospects,* K-2, May 1983). Unplanned pregnancies are rare because both injectables suppress ovulation in the great majority of cycles and because a woman needs only to obtain the next injection at the right time in order to assure continued effectiveness.

Several different regimens of DMPA have been used. In a recent randomized trial of two DMPA doses, none of the women receiving the standard 150 mg dose conceived, but the pregnancy rate among women receiving 100 mg every three months was 0.44 per 100 woman-years (268). With higher doses and a longer injection interval—250 to 450 mg every six months—pregnancy rates have ranged from 0 to 3.6 per 100 woman-years (150, 162, 200, 214).

NET EN is given in both 2-month and 12-week regimens. With the 12-week regimen, the first three 200 mg injections are given at 8-week intervals, and subsequent injections are given at 12-week intervals. The 2-month regimen is markedly more effective. Two-year cumulative life-table pregnancy rates with the 2-month regimen range from 0.4 to 1.8 per 100 women (112, 266, 271). In contrast, with the 12-week regimen 2-year rates as high as 6.6 per 100 women have been reported (112, 271). The World Health Organization (WHO) now recommends that NET EN be given at intervals no shorter than 46 days and no longer than 74 days (about 7 to 10 weeks) (67). Schering AG, manufacturer of NET EN, notes that contraceptive protection is not adequate if more than 12 weeks passes between injections

A pamphlet from the Philippines shows interested women learning about Depo-Provera (DMPA). Depo-Provera is the most popular long-acting progestin contraceptive, used by nearly 4 million. The pamphlet was prepared by Kabalikat ng Pamilyang Pilipino.

and recommends the 2-month regimen if the 12-week regimen is not possible (61).

Administering injectables in the first week of the menstrual cycle provides the greatest protection against pregnancy. It also ensures that the woman is not already pregnant at the time of the injection. Injections after the first week may not prevent ovulation in that cycle, increasing the risk of pregnancy (227). In a Thai study involving almost 8,000 women, the pregnancy rate after one injection among those who received DMPA in the first eight days of their cycles was 1.6 per 100 women compared with 6.2 for those who received the injection between the ninth and twenty-eighth days of their cycles (84).

There are few known contraindications to progestin-only injectables. WHO recommends that women should not use injectables if they are pregnant, have cancer of the breast or genital tract, or have abnormal uterine bleeding (259). WHO also recommends that, before giving injectables, health workers carefully consider the standard contraindications to combined estrogen-progestin oral contraceptives, even though it is not certain how applicable

Table 6. Characteristics and Status of Long-Acting Injectables as of March 1987

Hormone	Development & Testing	Duration of Action	Status of Animal Trials	Status of Human Trials			Availability
				Phase I	Phase II	Phase III	
DMPA (150 mg depot medroxyprogesterone acetate)	Upjohn Company	3 months	Completed	Completed	Completed	Completed	Approved in over 90 countries
NET EN (200 mg norethindrone enanthate)	Schering AG	2 months or 12 weeks	Completed	Completed	Completed	Completed	Approved in over 40 countries
HRP002 (6.25, 12.5, and 25 mg levonorgestrel butanoate)	WHO HRP	3 months	Underway	Completed in 3 sites in 50 women	Will begin in mid-1987		Expected to be available for pre-registration studies in 1992
HRP011 (20, 40, and 60 mg levonorgestrel 3-oxime cyclopentyl carboxylate	WHO HRP	2 months	Completed	Underway in 3 sites in 30 women	Will begin in early 1988		Mid-1990s

WHO HRP = World Health Organization Human Reproduction Program

these are. In addition, WHO advises that women with diabetes or a history of diabetes during pregnancy should be followed carefully, since some laboratory tests have shown that DMPA alters carbohydrate metabolism (259).

Menstrual Changes

Changes in menstrual patterns are the most common and troublesome side effect of DMPA and NET EN. Over two-thirds of women using DMPA and over one-half of women using NET EN have no regular cycles in the first year of use (10, 37, 43, 240, 267). Women may stop menstruating altogether (amenorrhea), have very irregular bleeding or spotting, or experience changes in the duration or amount of blood flow. Of these, amenorrhea is the most common and occurs more often with DMPA. During the first year of use about 55 percent of DMPA users do not menstruate for 90 days or more, compared with about 30 percent of NET EN users (41, 130, 271). As women continue using injectables, fewer experience intermenstrual bleeding and spotting, and more experience amenorrhea (271).

Very heavy or prolonged bleeding, a potential health threat, is uncommon (76, 130, 150, 272). In a WHO multicenter trial, for example, only 6 of 1,200 women (0.5 percent) needed treatment for heavy bleeding in almost 14,000 women-months of use (272). Similarly, in a 12-month field trial in Pakistan, only one of 2,147 women required curettage for prolonged bleeding (130).

Generally, amenorrhea and light bleeding or spotting do not require any medical treatment. Most family planning providers find that they can allay women's concerns by counseling them before an injection and reassuring them if menstrual changes occur. Oral contraceptives or supplemental estrogens to regularize menstrual bleeding are not prescribed routinely (76, 259). Very heavy or prolonged bleeding, however, does require medical attention. WHO recommends either (1) one combined oral contraceptive daily for 14 days or (2) an intramuscular injection of a synthetic estrogen—5 mg estradiol cypionate or estradiol valerate (261).

More women stop using injectables because of menstrual disturbances than for any other reason. In recent trials 6 to 30 percent of women discontinued the method in the first year because of changes in bleeding patterns (112, 130, 199, 251, 266, 270). Discontinuation rates vary widely, perhaps because of different cultural and religious attitudes toward menstrual disturbances or because of the varying availability of counseling and follow-up.

Reproductive Effects

Neither DMPA nor NET EN appears to have any permanent effect on fertility. With both injectables, however, women may not ovulate or conceive for several months after discontinuation. This delay has caused concerns about reversibility, particularly with DMPA. Because of fears that DMPA might cause permanent infertility, some national family planning programs do not allow women to use DMPA unless they have had at least one child (133).

The contraceptive effect of DMPA often lasts well beyond three months. In the largest study to date the median time to conceive after a DMPA injection was 9 months, or 5½ months after the end of the presumed duration of effectiveness. Despite this initial delay, over 60 percent of former DMPA users became pregnant within 12 months, and over 90 percent, within 24 months. These rates are similar to those among former users of oral contraceptives or IUDs (176). How long a woman has used DMPA and whether she has already had a child do not affect the speed with which fertility returns (159, 176, 215).

With NET EN, return of fertility also can be delayed. In a recent study of 69 women who stopped using NET EN to become pregnant and who were followed for a year, average time to conception was longer than among 92 former TCu-200 IUD users. After one year, however, 73 percent of former NET EN users and 84 percent of former IUD users had conceived. The difference is not statistically significant (289). In an earlier study of 40 women, 78 percent conceived within 12 months after the last injection (74). Most women ovulate within four months after discontinuation (72, 77, 253, 255). As with DMPA, duration of use does not affect how quickly fertility returns (74).

Questions have been raised about possible harmful effects on children exposed to injected progestin contraceptives either in utero or during breast-feeding. Several studies in the 1970s reported no increase in birth defects or prematurity when pregnant women were inadvertently given contraceptive doses of injectable progestins (136, 161, 247). In a recent study of Thai children by Tieng Pard-

What Providers Should Know About Long-Acting Injectables

1. The standard regimens are 150 mg DMPA every three months and 200 mg NET EN every two months or 12 weeks.
2. Injectables are very effective. Failure rates are usually less than one or two percent.
3. The weight of available evidence suggests no increased risk of cancer with DMPA. Whether NET EN affects risks of cancer in women has not been studied.
4. Injectables change menstrual bleeding patterns. From 30 to 60 percent of users develop amenorrhea.
5. Medical treatment for menstrual irregularities is not necessary unless a woman is bleeding very heavily. This complication is quite rare.
6. Women may be infertile for four to nine months or more after an injection. Fertility returns eventually, however.
7. Injectables do not seem to interfere with breast-feeding. The small amounts of hormone in breast milk do not appear to harm the infant.
8. Before receiving an injection, women must be aware that any side effects may persist for the 2- or 3-month period of effectiveness and that return of fertility may be delayed.
9. If possible, injectables should be given during the first week of the menstrual cycle to insure that the woman is not already pregnant.
10. Injectables have beneficial health effects. They often increase blood iron levels, and they appear to help protect against pelvic inflammatory disease and ovarian and endometrial cancer.

thaisong and colleagues, however, children of former users of DMPA were two times more likely to have peripheral limb defects and about five times more likely to have chromosomal abnormalities than children of women who used no contraception. Interpreting these results is difficult, in part because the number of cases is small and in some cases exposure long preceded pregnancy (177). Preliminary analysis from a study in Israel, involving nearly 200 adolescents who were exposed in utero to medroxyprogesterone acetate and over 950 controls, found no evidence of retarded or precocious development or any disturbance in sexual development, sexual behavior, or growth among those exposed (101). These studies in Thailand and Israel, supported by WHO and Family Health International (FHI), are continuing to look at children exposed in utero to DMPA, medroxyprogesterone acetate (MPA), or oral contraceptives (261).

The very small amount of hormone transmitted in breast milk appears to have no effects on children even when followed up to 10 years (127, 129, 247). A Chilean study found that a higher percentage of DMPA users' four-year-old children weighed below average than did nonusers' children. The researchers attributed this difference to factors other than DMPA use, since the mothers using DMPA were older, had more children, and had breast-fed their children longer (127).

Cardiovascular Effects

Unlike oral contraceptives that contain estrogen, DMPA and NET EN appear to have little effect on the cardiovascular system. There have been very few reports of blood clots or other cardiovascular complications in women using injectables, but adequate epidemiologic studies have not yet been conducted. In the laboratory most studies find no change in blood pressure or in the coagulation and fibrinolytic systems that affect blood clotting (111, 150, 258).

Effects on lipid metabolism are less clear since long-term studies are not finished. Most reports find either no change in total cholesterol and triglycerides or a decrease, a possibly beneficial effect (11, 12, 63, 88, 150, 167, 242, 262). In contrast, a few studies report an increase in cholesterol with longer use of DMPA (149) or a decrease in high-density lipoproteins (HDL), both possibly adverse effects (128, 138). The only study involving NET EN also found a decrease in HDL (73). Because NET EN is chemically similar to testosterone, it is likely that it would reduce HDL levels slightly. Whether the small decreases in HDL sometimes seen in women using injectables have any clinical importance is not certain. WHO trials are underway in five countries to measure lipid metabolism in women using DMPA and NET EN for short and long periods (260).

Cancer

Questions about whether long-acting injectables cause cancer have aroused controversy. This is the main reason that DMPA has not been approved for contraceptive use in the US. These questions have arisen because (1) two species of laboratory animals—beagle dogs and rhesus monkeys—given large doses of DMPA or NET EN, usually for long periods, have developed benign and malignant tumors of the breast or endometrium (lining of the uterus) (61, 75, 247, 264) and (2) until recently human studies have been limited. Questions about the relevance of animal studies to humans are still unresolved (2, 62, 70, 104, 264, 272).

A pamphlet from the Sierra Leone Home Economics Association reminds women that DMPA works for three months.

Two recent studies of women, however, provide some reassurance that DMPA does not increase the risk of several types of cancer. WHO conducted a case-control study involving over 1,500 cases and over 5,800 controls in Kenya, Mexico, and Thailand. The US Centers for Disease Control and other organizations conducted a smaller study in Costa Rica involving over 700 women with breast cancer, invasive cervical cancer, or cervical carcinoma in situ and over 760 controls. Like other epidemiological and clinical research in the US, Canada, and Thailand (66, 86, 148, 163), the WHO case-control study found no link between DMPA use and cancer of the breast, endometrium, ovary, or liver (263). In fact, like oral contraceptives, DMPA may help protect against cancers of the ovary and endometrium (see Table 7).

The Costa Rican study found a two-fold greater risk of breast cancer among former DMPA users than among

Table 7. Risks of Various Cancers and DMPA Use, World Health Organization 3-Country Case-Control Study, 1986

Site of Cancer	No. of Cases Who Used DMPA/ All Cases (%)	No. of Controls Who Used DMPA/All Controls (%)	Relative Risk for Women Who Have Ever Used DMPA*
Breast	39/427 (9)	557/5,951 (9)	1.0
Cervix	126/920 (14)	545/5,833 (9)	1.2
Ovary	7/105 (7)	74/637 (12)	0.7
Endometrium	1/52 (2)	30/316 (9)	0.3
Liver	7/57 (12)	34/290 (12)	1.0

*Adjusted for center and for factors known to affect cancer risk. None of these relative risks is significantly different from 1.0.

Source: World Health Organization (236)

nonusers—a statistically significant difference. The researchers regard these results as inconclusive, however. The number of cases is small—only 19 women with breast cancer had ever used DMPA. Furthermore, there is no indication that risk increased with duration of use, as might be expected if DMPA caused breast cancer (143).

In the WHO study the risk of invasive cervical cancer appeared to be slightly higher for former DMPA users than for controls, but the difference was not statistically significant. The study found that women younger than 36 who had used DMPA for more than four years were two times more likely to develop cervical cancer than controls younger than 36. Interpreting this finding is difficult because the number of cases is small (263). Furthermore, the Costa Rican study found no increased risk of either invasive cervical cancer or cervical carcinoma in situ among former DMPA users of any age or with any duration of use (171, 172). While both studies were able to control for some variables known to influence risk of cervical cancer—the woman's age at first intercourse and the number of sexual partners—neither took account of other important influences—the sexual behavior of the women's partners or, in the WHO study, smoking (171, 172, 263).

Beneficial Effects

Like oral contraceptives, injectables have several beneficial effects in addition to preventing unplanned pregnancy. Hemoglobin levels often increase in women using DMPA or NET EN (42, 107, 262). This may help to prevent anemia, a common problem among women in developing countries. In addition, some women with sickle-cell disease have less pain and fewer abnormal red blood cells while using DMPA or other steroid hormones (38, 260). DMPA also appears to protect against some reproductive tract infections. According to a study of more than 300 women with PID and more than 600 matched controls, DMPA users were half as likely as nonusers to develop pelvic inflammatory disease, a major cause of infertility (83). Preliminary reports also suggest that DMPA protects against vulvovaginal candidiasis, a fungal infection (54). As noted, DMPA also may lower the risk of ovarian and endometrial cancer.

Continuing Controversy Over DMPA

DMPA has been the subject of debate for many years. On one hand, critics argue that DMPA is unsafe because it causes cancer in some laboratory animals and because not enough is known to rule out long-term risks to women. They also are concerned that injectables—because they are so easy to administer—may be given to women without proper precautions and full informed consent (106, 145). On the other hand, supporters of DMPA point out that epidemiological and clinical studies provide no clear proof of increased risk of cancer or other harmful effects among DMPA users and that the relevance of animal tests to humans is uncertain. In addition, they argue, the known benefits of DMPA outweigh any plausible risks as yet undetected (27, 259).

The ongoing debate has prevented the marketing of DMPA as a contraceptive in the US. In 1967 the Upjohn Company first applied to the US Food and Drug Administration (US FDA) for approval to market DMPA as a contraceptive. Eleven years later, in 1978, the US FDA formally denied approval even though its own Obstetrics and

Tests Underway on New Long-Acting Ester Injectables

A 12-year collaboration between the World Health Organization (WHO), the US National Institute of Child Health and Human Development (US NICHD), and scientists throughout the world has led to several new injectable compounds that may prevent pregnancy for two or three months.

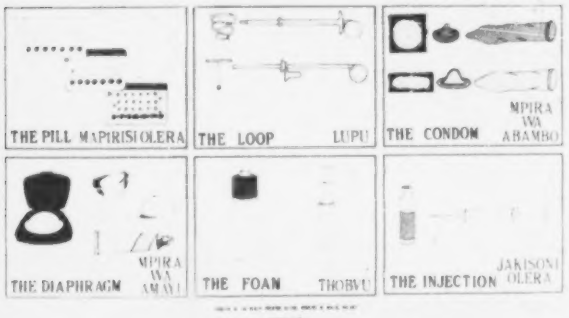
In 1975 WHO convened a group of chemists and biologists to begin the development of new contraceptive steroids. Research focused on two progestins—norethindrone (NET) and levonorgestrel—that had already been shown to be safe and effective in humans. The scientists synthesized over 230 esters derived from NET or levonorgestrel. (An ester is a combination of a steroid and an acid.) US NICHD then tested these compounds in animals. Four compounds, all derived from levonorgestrel, were selected for further testing because they consistently inhibited ovulation in animals and also appeared to be long-acting (99).

The WHO Human Reproduction Program is conducting studies of two of the four new compounds in women to find the lowest effective dose (31) (see Table 6). Trials with one compound—designated HRP002—suggest that a 20 mg dose will prevent ovulation for three months (260). Preliminary effectiveness trials are planned to begin in 1987 (97).

The appropriate dose for the second compound, HRP011, has not yet been established. This compound is chemically similar to another progestin, norgestimate, that does not cause marked endometrial or menstrual changes in animals (see p. K-68). WHO plans to begin small effectiveness trials of HRP011 in women, which will determine whether it will have less effect on bleeding patterns than DMPA and NET EN (97). Initial studies of HRP011 in a small number of women in the US are being planned for late 1987 (31).

The Contraceptive Development Branch of US NICHD has completed 2-year toxicology studies of HRP011. Studies in rats and monkeys with low, intermediate, and high doses—up to 50 times the human dose—show no harmful effects (31).

These new compounds have several important advantages over existing injectables. Because of the chemical properties of esters, the new injectables are released from the injection site at a fairly constant rate, without the initial high release that occurs with DMPA and NET EN. In addition, unlike the injectable microspheres, which also have fairly constant release rates, the new injectables can be administered in a simple aqueous microcrystalline suspension like that used for DMPA. Thus they can be manufactured easily and inexpensively. Like DMPA and NET EN, they will be administered with a simple injection. Thus many different types of health workers could administer these new contraceptives without special training.


CHILD SPACING METHODS IN MALAWI
NJIRA ZOTHANDIZA KULERA M'MALAWI
THE PILL MAPIRISI OLERA
THE LOOP LUPU
THE CONDOM MPIRA WA ABAMBO
THE DIAPHRAGM MPIRA WA AMAYI
THE FOAM THOBVU
THE INJECTION JAKISONI OLERA

Injectable contraception is one of several child-spacing methods in Malawi. Because many health workers know how to give injections, this method can be easily and widely offered.

Gynecology Advisory Committee had twice recommended approval for certain groups of US women. In 1983 a Public Board of Inquiry, especially convened at the request of the Upjohn Company, conducted hearings to reconsider the US FDA's decision and make a recommendation to the Commissioner of the agency. The Board consisted of three scientists jointly selected by Upjohn and the US FDA. In late 1984 the Board released its conclusions. Two of the three members concluded that there was insufficient evidence to prove that DMPA was safe for general marketing in the US (254). The third member recommended that DMPA be approved for use by women who could not use other methods (209). To date, the Commissioner of the US FDA has not acted on these recommendations, and the future of DMPA in the US remains uncertain. In 1986 the Upjohn Company reopened the issue by submitting new data on the safety of DMPA, including the WHO study results on cancer. Upjohn plans to submit a new application for approval of DMPA (59).

Since 1980 regulatory agencies in Sweden, the UK, France, and West Germany have approved DMPA for contraception (246). Also since 1980, several national and international scientific groups have endorsed DMPA, including the Toxicology Review Panel of the WHO Special Programme of Research, Development and Research Training in Human Reproduction (the Human Reproduction Program) (259) and the International Medical Advisory Panel of the International Planned Parenthood Federation (120). Currently, the US Agency for International Development does not distribute DMPA because it is not approved for contraceptive use by the US FDA. International donors are providing DMPA and NET EN to family planning programs in countries where these injectables have been approved (see p. K-78).

MONTHLY INJECTABLES

Monthly injectables are widely used in Latin America and China. They consist of an estrogen and a progestin combined. They are highly effective, but questions about the safety of the products sold in Latin America have not been resolved, and the formulation used in China has not been thoroughly studied. The World Health Organization (WHO) is currently supporting research on two new monthly injectables. They appear to be effective and safe and may become available as early as 1988.

Estrogen-progestin combinations injected monthly have certain advantages over 2- or 3-month progestin-only injectables (96). They produce regular bleeding episodes each month and cause less spotting and other bleeding irregularities. Also, they are less likely to cause amenorrhea, which women may fear is a sign of pregnancy. Many women in a Mexican study said that they preferred monthly injectables because the monthly bleeding reminded them to return for another injection. They thought that remembering the date of their last injection over a 2- or 3-month period would be too difficult (64). Also, if women experience side effects and want to discontinue use, the side effects of monthly preparations generally subside more quickly than those of longer-acting injectables (222, 243). In Latin America pharmacists may promote monthly injectables because they can give the injections every month. Also, women may be able to pay for a monthly injection more easily than saving for a more expensive longer-acting injection.

Monthly injectables have certain disadvantages as well. These include the inconvenience of more frequent injections, the higher total cost of 12 rather than 4 or 6 injections per year, and possible side effects of the estrogen component in some preparations (222, 296).

Two Preparations Now Available

Two estrogen-progestin formulations are currently in use:

(1) a combination of 75–150 mg **dihydroxyprogesterone acetophenide** and 5–10 mg **estradiol enanthate**, used primarily in Latin America, and

(2) a combination of 250 mg **17-hydroxyprogesterone caproate** and 5 mg **estradiol valerate**, used only in China.

The first preparation is now used by an estimated 300,000 women in Mexico and perhaps as many more in other Latin American countries. The preparation was originally developed by Squibb Pharmaceutical Corporation, which called it Deladroxate. Squibb no longer manufactures Deladroxate. The similar preparations currently marketed are manufactured by several small companies in Latin America and sold under various brand names including Perlutal and Agurin (80, 98, 204) (see photo, p. K-76). In the US, Squibb Pharmaceutical Company withdrew Deladroxate from clinical testing in the late 1960s because of concerns over (1) breast tumors in beagle dogs, (2) pituitary hyperplasia in rats, and (3) possible accumulation of estradiol enanthate in the body with continued use (89, 98, 243). Subsequently, however, questions have been raised about whether such animal findings are applicable to humans. Research suggests that the adverse effects of Deladroxate on animals may occur only with doses higher than the equivalent of a contraceptive dose (2, 62, 82, 121, 272).

In clinical tests of 150 mg dihydroxyprogesterone acetophenide and 10 mg estradiol enanthate involving nearly 23,000 cycles in 2,400 women, no pregnancies were reported. Between 8 and 26 percent of women stopped using this injectable because of bleeding problems (29, 80). Return of ovulation may be delayed slightly (131). Little

Table 8. Characteristics and Status of Monthly Injectables as of March 1987

Hormone	Development & Testing	Duration of Action	Animal Trials	Human Trials			Estimated Availability
				Phase I	Phase II	Phase III	
Cycloprovera (25 mg DMPA & 5 mg estradiol cypionate)	WHO HRP, Family Health International	1 month	Completed	Completed	Underway at 3 sites in 150 women	Underway at 17 sites in 1,200 women	First approvals expected in early 1990s
HRP102 (50 mg NET EN & 5 mg estradiol valerate)	WHO HRP, Family Health International	1 month	Completed	Completed	Underway at 4 sites in 200 women	Underway at 17 sites in 1,200 women	First approvals expected in early 1990s

WHO HRP = World Health Organization Human Reproduction Program

other research is available on any aspect of the monthly preparations currently marketed in Latin America.

Some are concerned that the synthetic estrogen in the Latin American products may build up in the body over time. This could contribute to the delay in return of fertility after discontinuation or cause unforeseen toxic effects (223, 243). Although no such effects have been reported, very little research on estrogen accumulation in women has been done. One study in four subjects found an apparent accumulation of estrogen (89). Another found no significant accumulation in six subjects (201). To avoid estrogen accumulation, half doses once a month have been tried, and some companies in Latin America sell them (204). The lower doses prevent pregnancy effectively but severely disrupt menstrual patterns (201).

In China a formulation called Injectable Number 1 accounts for less than one percent of all contraceptive use. A woman who uses this method receives two injections the first month and one injection every month thereafter (109, 178). The major obvious disadvantage of Injectable Number 1 is that it causes very short cycles and prolonged menstrual bleeding (243). Few toxicology and use-effectiveness data on Injectable Number 1 are available, however. It is not used outside China.

Various monthly injectables consisting of a progestin and an estrogen are sold in Latin America. Little research has been done on these formulations. Two new monthly injectables, developed by WHO, may be introduced by some family planning programs through preregistration field trials in early 1988.

Two New Preparations Studied

Two other estrogen-progestin injectables provide virtually complete contraceptive protection and excellent menstrual cycle control. Both are being tested and may be marketed soon. They are:

(1) **Cycloprovera**, a combination of 25 mg depot medroxyprogesterone acetate (DMPA) and 5 mg estradiol cypionate, and

(2) **HRP102**, a combination of 50 mg norethindrone enanthate (NET EN) and 5 mg estradiol valerate (80, 98, 243).

Currently, the World Health Organization (WHO) and Family Health International (FHI) are about to complete trials of Cycloprovera and HRP102 involving about 2,400 women in three countries. Preliminary results show that both formulations are highly effective. Among women receiving Cycloprovera, only one pregnancy occurred in the first 655 woman-years of use. With HRP102, in 648 woman-years of use four women have become pregnant, but two may have been pregnant when they received their first injections (288).

In early trials both preparations have produced bleeding patterns like normal menstrual cycles (3, 71, 113, 116). Only the Philippine center has reported detailed results: most women receiving HRP102 for one year experienced unchanged bleeding patterns, while those receiving Cycloprovera tended to have somewhat shorter, less heavy bleeding each month (96). In the first nine months of the WHO/FHI multicenter trials, less than 5 percent of participants have stopped use due to bleeding irregularities, and less than 2 percent, for amenorrhea (96, 97, 288).

Side effects other than bleeding problems have been minor with both Cycloprovera and HRP102. Slight weight gain is common with both (28, 46, 80). Since both can be detected in the blood for as long as three months after an injection, there may be some delay in the return of fertility after discontinuation (28, 71, 98, 134). The only available study to date involved 18 Thai women who discontinued Cycloprovera to become pregnant. Seven became pregnant by 3 months, and 7 more by 18 months (80, 135).

Cycloprovera and HRP102 are not currently marketed. Several national family planning programs are planning preregistration field trials beginning in early 1988 (97). Along with the microspheres, microcapsules, and new long-acting esters, these new monthly injectables will comprise a new generation of injectable contraceptives.

USE OF INJECTABLES

Injectables are currently the only widely used long-acting hormonal contraceptive. An estimated 6.5 million women are using them. About five million of these women use the longer-acting injectables, DMPA or NET EN, and the remaining 1.5 million—mostly in Latin America and China—use various monthly injectables (97, 109, 212). According to surveys (see Table 9) and production and sales data, injectables are most widely used in Jamaica, Thailand, Indonesia, Mexico, New Zealand, and China.

DMPA, marketed as Depo-Provera by the Upjohn Company, is the most widely used injectable. It is approved as a contraceptive in more than 90 countries and has been used in some for as long as 20 years (246). Sales of Depo-Provera have increased steadily in recent years, from about 7 million doses in 1982—enough to protect 1.8 million women for a year—to about 16.5 million doses in 1986—enough to protect more than 4 million women (see Table 10). Limited quantities of DMPA are produced by a number of manufacturers apart from Upjohn.

NET EN, marketed by Schering AG as Noristerat, also is widely used. It is approved in more than 40 countries. Schering AG reports that sales have been increasing rapidly. The company sold about one million doses in 1981 but in 1986 sold almost five million—enough to protect 800,000 women for a year (69) (see Table 10).

The overall estimate of 6.5 million users is based on family planning survey data, program statistics, donor agency shipments, and manufacturers' sales. A precise estimate is impossible because: (1) representative sample surveys do

Table 9. Percentage of Married Women of Reproductive Age Using Injectable Contraceptives, as Reported in Representative Sample Surveys, 1974–1984

Region & Country	Year	% Using: Any Method	% Using: Injectables	% of Contraceptors Using Injectables
AFRICA				
Botswana	1984	29	1	4
Burkina Faso	1986	13	<0.5	2
Kenya	1977–78	7	1	9
	1984	17	1	3
Lesotho	1977	5	<0.5	4
Nigeria	1981–82	5	<0.5	2
Sudan (north)	1978–79	5	<0.5	3
Zaire (urban)	1982–84			
Kananga		12	<0.5	3
Kinshasa		36	1	4
Kisangani		19	<0.5	2
Lubumbashi		36	1	2
Zimbabwe	1984	40	1	2
ASIA & PACIFIC				
Bangladesh	1979–80	9	<0.5	1
Fiji	1974	42	<0.5	1
Hong Kong	1982	72	3	4
Indonesia (Java & Bali)	1976	28	<0.5	1
Indonesia (urban)	1983			
Jakarta		44	7	17
Medan		36	5	13
Semarang		54	13	24
Surabaya		46	4	8
Ujung		33	5	15
Korea, Rep. of	1974	37	<0.5	1
	1979	54	<0.5	<0.5
Malaysia (peninsular)	1974	35	<0.5	1
Nepal	1981	7	<0.5	1
Philippines	1978	39	<0.5	<0.5
Sri Lanka	1975	34	<0.5	1
	1982	57	2	3
Thailand	1975	36	2	6
	1978	52	5	9
	1981	59	7	12
	1984	65	8	12
MIDDLE EAST & NORTH AFRICA				
Egypt	1980	25	<0.5	<0.5
Jordan	1976	26	<0.5	2
	1983	26	<0.5	<0.5
Morocco	1979–80	20	<0.5	<0.5
Syria	1978	20	<0.5	2
Tunisia	1978	32	<0.5	1
	1983	42	<0.5	1
Yemen Arab Rep.	1979	1	<0.5	4
LATIN AMERICA & CARIBBEAN				
Barbados	1980–81	47	3	5
Bolivia	1983	26	<0.5	2
Brazil				
Amazonas (urban)	1982	53	<0.5	<0.5
Northeast region	1980	37	<0.5	<0.5
São Paulo	1978	66	<0.5	<0.5
Southern region	1981	66	<0.5	<0.5
Colombia	1976	45	<0.5	1
	1978	48	1	3
	1980	51	1	3
	1986	63	2	4
Costa Rica	1976	67	2	3
	1978	65	2	3
	1981	66	2	3
Dominican Republic	1975	33	<0.5	<0.5
	1983	47	<0.5	<0.5
Ecuador	1979	35	1	3
El Salvador	1978	34	<0.5	1
Guatemala	1978	18	1	6
	1983	25	<0.5	1
Guyana	1975	35	<0.5	1
Haiti	1983	7	<0.5	2
Honduras	1981	27	<0.5	1
Jamaica	1975–76	40	7	17
	1983	52	8	15
Mexico	1976–77	32	2	6
	1978	42	3	7
	1979	40	3	7
	1982	46	5	11
Panama	1976	55	1	1
	1979–80	62	1	2
Paraguay	1977	31	1	2
	1979	39	2	5
Peru	1977–78	33	1	3
	1981	43	2	4
Trinidad & Tobago	1977	55	1	2
Venezuela	1977	49	<0.5	<0.5

Source: London et al. (153), except Burkina Faso 1986: Burkina Faso (282); Kenya 1984: Kenya Central Bureau of Statistics (291); Colombia 1986 and Mexico 1982: Ochoa (294); and Thailand 1984: Chamratrithirong et al. (39)

Table 10. Worldwide Sales of Depo-Provera 150 (DMPA) and Noristerat (NET EN), 1975–86

Year	Thousands of Doses Sold	
	Depo-Provera	Noristerat
1975	4,386	2
1976	4,079	28
1977	4,766	78
1978	7,041	545
1979	6,880	796
1980	7,028	557
1981	6,788	1,035
1982	7,362	1,418
1983	10,066	1,441
1984	15,628	2,485
1985	14,527	4,100
1986	16,500*	4,800*

*Estimated

Source: Schering AG (69, 213); Upjohn International (33, 58)

not cover all countries, and most surveys are now at least several years old; (2) program statistics on new clients are a poor indicator of prevalence, since discontinuation rates are not reported; (3) donor agency shipments and sales by manufacturers do not reliably indicate current use because large shipments are typically delivered in one year and used over the course of two or three years.

Among countries with surveys of contraceptive use (see **Population Reports**, *Fertility and Family Planning Surveys: An Update*, M-8, September-October 1985), **Jamaica** has the highest percentage of women using injectables. In 1983, 8 percent of married women of reproductive age, or 15 percent of all contraceptors, used DMPA. One-third of married women of reproductive age had used injectables at some time (212). There is some evidence that usage may have been higher previously. Family planning clinic records indicate that the percentage of new clients choosing injectables fell from 34 percent in 1976 (17) to 27 percent in 1983 (212). Also, a 1984 Pan American Health Organization study found overstocks of injectables in many clinics (248).

In **Thailand** DMPA has been available for more than 20 years. The government family planning program has offered DMPA since 1979 and NET EN since 1984 (212). According to the 1984 Contraceptive Prevalence Survey, injectables were the third most widely used method, after oral contraceptives and voluntary female sterilization. Between 1981 and 1984 the percentage of married women of reproductive age using injectables changed little, rising from 7.1 to 7.6 percent. In both years about 12 percent of contraceptors used injectables (39). In 1984 well over 400,000 women were estimated to be continuing users, and in 1985, 26 percent of new clients in the national family planning programs chose injectables, mostly DMPA (133, 212).

Injectables are widely used in **Indonesia**, even though the government has promoted IUDs and oral contraceptives rather than injectables (117). In 1983 in one Indonesian city, Semarang, 13 percent of married women of reproductive age—almost one-fourth of all contraceptors—used injectables. Nationally, as many as 10 percent of contraceptors used them. DMPA was introduced in 1967, but the government family planning program did not distribute it until 1978. NET EN also is available, but its use has been restricted to specific areas to prevent confusion with DMPA, since NET EN does not last as long as DMPA (212). Norplant implants have been available through the national family planning program since 1986, and use is growing rapidly (see p. K-64).

In **Mexico** about 5 percent of married women of reproductive age, or 11 percent of contraceptors, use injectables, according to a 1982 national survey. Various monthly injectables account for about 80 percent of injectables sold. Both DMPA and NET EN are available, with NET EN more popular. Controversy over DMPA has suppressed sales. Most women obtain injections at pharmacies (204). The demand for injectables is higher in rural than in urban areas (204, 212, 294).

In **New Zealand** an estimated 4 percent of married women of reproductive age use DMPA. This may be the highest level of use in any developed country. Depo-Provera has been used in New Zealand for almost 20 years. Sales increased steadily from the late 1960s to 1982, when about 86,000 doses were sold. Perhaps partly due to a highly publicized controversy over whether the injectable causes serious side effects, sales fell to about 80,000 doses in 1983. In 1986, however, sales had again neared 86,000 doses (110, 207).

In **China** production figures suggest that just under one percent of married women of reproductive age, or slightly more than one percent of contraceptors, use the monthly Injectable Number 1, which is manufactured by the government. A variety of other monthly preparations are in clinical trials (109, 273). The one million Chinese women estimated to be using monthly injectables account for about one-sixth of all women using injectables worldwide. There have been reports that use of Injectable Number 1 has been declining recently (97).

Donor Agency Supplies of Injectables

The United Nations Fund for Population Activities (UNFPA) and the International Planned Parenthood Federation (IPPF) are the major international donors of injectable contraceptives. Between 1983 and 1986 they supplied about 5.1 million doses of DMPA—enough to protect 320,000 women each year—and 1.5 million doses of NET EN—enough to protect 60,000 women each year.

DMPA accounted for about 90 percent of the injectables provided by IPPF and 70 percent of those provided by UNFPA, and NET EN accounted for the remainder. Of DMPA, over half of IPPF supplies and almost 40 percent of UNFPA supplies went to countries in sub-Saharan Africa. Three countries—Nigeria, Zaire, and Kenya—received almost one-fourth of the DMPA shipped by the two agencies. About 40 percent of all IPPF supplies and half of UNFPA supplies went to Asian and Pacific countries, mainly to Bangladesh and Nepal. Only about 9 percent of IPPF supplies and 10 percent of UNFPA supplies went to Latin American or Caribbean countries, mainly to Jamaica (123, 245).

Donor shipments of NET EN are smaller. UNFPA shipped over one million doses, but only to eight countries. Over 95 percent went to Pakistan and Bangladesh (245). IPPF supplied 32 countries but shipped less than a quarter of a million doses, three-quarters of it to sub-Saharan Africa and over half to Nigeria, Rwanda, and Zaire. The rest went mostly to El Salvador and Mexico (123).

INTRODUCING A NEW CONTRACEPTIVE METHOD

Laboratory and clinical research to test the effectiveness and safety of several new implants and injectables will be completed by the late 1980s and 1990s. But introducing a new method to the public raises other issues. Without careful preparation, the new contraceptives may be ignored by health professionals and women; unwanted pregnancies may occur; and complication and discontinuation rates may be high. To launch any new method successfully, developers, manufacturers, and program managers must carefully consider:

- manufacture and marketing,
- costs and pricing strategies,
- delivery systems,
- training of health personnel,
- communication to providers and potential users, and
- postmarketing surveillance.

Careful introduction of a new method on a worldwide basis can require the skills of various organizations as well as those of individual scientists and service providers in many countries. For example, to assist with the development and introduction of Norplant, the Population Council has worked closely with the International Committee for Contraception Research, a group of scientists organized by the Population Council; Family Health International (FHI); the Program for Appropriate Technology in Health/Program for the Introduction and Adaptation of Contraceptive Technology (PATH/PIACT); the Association for Voluntary Surgical Contraception; the World Health Organization (WHO); and the International Planned Parenthood Federation (IPPF).

Manufacture and Marketing

Because of the shift in contraceptive research and development away from private commercial firms to government agencies and nonprofit organizations (see box, p. K-70), the process of manufacturing and marketing contraceptives is changing. At present, governments, international agencies, and private nonprofit organizations, such as the US National Institute of Child Health and Human Development (US NICHD), WHO, the Population Council, and FHI have taken the lead in developing new long-acting methods. Such organizations do not manufacture and distribute contraceptives themselves, however. Thus arrangements must be made with commercial firms for large-scale manufacture and marketing. For example, to produce both the 6-capsule and 2-rod Norplant systems, the Population Council has granted an exclusive license to Leiras Medica/Huhtamäki Oy, an international pharmaceutical firm based in Finland. The agreement requires that Leiras charge a lower price to public-sector organizations and government programs than to commercial distributors (287).

Chinese workers package ampoules of Injectable Number 1 in a new factory in Shanghai. The factory currently produces injectable contraception for an estimated one million women a year. (Courtesy of PATH/PIACT)

It is not certain who will manufacture and market the other new methods. Many of the new long-acting hormonal methods are being developed initially by nonprofit organizations. Private pharmaceutical companies in the US and Europe have the first option to market some of the new long-acting methods such as Capronor, some injectable microspheres, and some long-acting injectables and own all rights to other injectable microspheres and capsules. Given concerns about product liability, however, particularly in the US, drug companies may be unwilling to market any new contraceptives even though tests prove them to be safe and effective.

Local production of contraceptives in developing countries is an alternative to international distribution by pharmaceutical firms. In China a factory built with support from the United Nations Fund for Population Activities (UNFPA) and technical assistance from PATH/PIACT is designed to produce about 30 million doses of Injectable Number 1 each year (109). DMPA and several monthly injectables are manufactured or packaged in a number of Asian and Latin American countries (150). Local production may be possible for some of the other new long-acting methods once the manufacturing processes are established.

Names for Norplant

How do you translate "Norplant"? It is not easy. The Population Council coined the name by combining parts of the words "norgestrel" (the former name for levonorgestrel) and "implant." But women around the world have chosen their own names for the method.

Some names reflect the implants' appearance or placement. In Ecuador Norplant is called *el abanico* ("the fan") because the implants are inserted in a fan-like pattern in the arm. Other names are *la mariposa* ("butterfly"), *los tubitos* ("little tubes"), and sometimes *la capsula* ("the capsule"). In Sri Lanka women call Norplant *tampatah* ("down under"), because the implants are inserted under the skin, or "sticks" (195).

In Indonesia Norplant gets the name *susuk* from the gold or other metal traditionally implanted under the skin to bestow supernatural power on the user (5, 195). Since Norplant is so widely known as *susuk*, this name is now used in pamphlets, posters, and other educational materials (see photo, p. K-59).

In most countries new methods must comply with national regulatory requirements before they can be registered and marketed. Some governments require clinical trials in-country. As part of the agreement with the Population Council, Leiras Medica takes responsibility for registering Norplant. To date seven countries—Finland, Sweden, Indonesia, Thailand, Ecuador, the Dominican Republic, and Colombia—have registered the 6-capsule Norplant system, and one country—Finland—has registered the 2-rod Norplant-2 (85, 189). Applications for approval of the 6-capsule system have been filed in other countries in Africa, Europe, Asia, and Latin America (124). An application for Norplant-2 will be filed in the US in 1987 (85).

Cost

What do the new methods cost? While prices vary depending on quantity, timing of purchase, delivery schedule, exchange rate, and other factors, the implants and injectables are generally more expensive than oral contraceptives. Shown below are sample or expected prices charged by manufacturers to donor agencies that buy in large quantities:

Sample or Expected Prices to Donors for Various Contraceptive Methods

Method	Current or Expected Price to Donors (in US$)	
	Per Dose	Per Year
Combined estrogen-progestin oral contraceptives	$ 0.15 per cycle*	$ 1.95
Norplant (5-year, 6-capsule system)	14.00	2.80
Norplant-2 (3-year, 2-rod system)	9.00	3.00
DMPA (3-month injectable)	1.00	4.00
NET EN (2-month injectable)	1.00	6.00
Cycloprovera (monthly injectable)	.80	9.60
HRP102 (monthly injectable)	.80	9.60

*Price paid by US Agency for International Development for oral contraceptives shipped to national family planning programs, as of April 1987

Sources: Blackburn (281), Castle (36), Chatwal (40), Hall (97)

Prices are not necessarily the same for all purchasers and are often lower for public or nonprofit organizations than for commercial distributors.

Norplant-2, the 2-rod system, is less expensive than the 6-capsule system, partly because the manufacturing process is almost completely automated. The cost of Norplant-2 will almost certainly be even lower as more devices are made (124). The trocar used with both systems costs about $6 (85).

The prices of other new methods are not yet established. Biodegradable pellets probably will cost less than implants or injectables because they are easier to make (79).

The cost of supplies is only part of the cost of delivering a contraceptive. Numbers of staff, staff training, and staff time per client are all important to total cost. On one hand, short-acting methods such as monthly injectables require more clinic visits than longer-acting methods. On the other hand, training health workers to deliver the longest-acting methods—inserting and removing Norplant implants or IUDs and performing sterilization—is more costly than teaching someone to administer injections. Also, these methods require relatively time-consuming procedures. In addition, implants and sterilization require additional supplies: surgical gloves, sterile drapes, local anesthesia, and surgical instruments.

Delivery in Family Planning Programs

All of the new implants and injectables are likely to be distributed largely through family planning programs, at least initially. What is the best way to introduce a new contraceptive into a family planning program? Experience with IUDs, oral contraceptives, and now Norplant suggests that pilot studies, a specific marketing or distribution plan, and thorough training of health workers can improve the way a method is accepted and how effectively and safely it is used.

Introducing a new method on a limited basis—first in one center or one district—is a good way to assess potential demand for the product and to determine how to train health workers and counsel users (277). The Population Council has supported such pre-introduction trials for Norplant in 26 countries in Latin America, Asia, and Africa (183). WHO has sponsored similar trials to introduce NET EN and DMPA into family planning programs in six countries and is planning similar trials for Cycloprovera and HRP102 (57, 130, 199, 251).

The more channels by which a contraceptive method is distributed, the more people will have access to it. Should the new implants and injectables be offered only in clinics by doctors and other specially trained health workers? Or can they be distributed through channels that are more accessible to the community—community-based distribution, social marketing, or commercial sales? To date, Norplant has been offered only in clinics and hospitals, as recommended by the Population Council, WHO, and IPPF (119, 269). As more health workers are trained, and experience with the method grows, it is possible that Norplant and other implants can be provided in temporary centers. This has been done with male and female sterilization—procedures more complex than inserting or removing implants.

A variety of health workers can learn to insert implants, just as they have learned to insert IUDs and perform mini-laparotomies. In an Indonesian study the average insertion times and complication rates were the same whether auxiliary health workers or doctors inserted the implants

With light from a battery-powered lamp, a doctor inserts Norplant in a woman's arm in a rural clinic in Kenya. This pilot program is assessing the training and equipment needed to deliver Norplant in clinics without electricity or running water. (Population Council)

(5, 6). In Chile, Brazil, and the US, nurse-midwives and nurse practitioners have inserted implants (52, 67). Because special training and frequent practice are necessary, however, it is unlikely that Norplant could be offered by many pharmacists or other commercial providers.

By comparison with inserting implants, giving injections is easy. Many people can learn to administer them. Around the world paramedical workers, pharmacists, and community-based workers give injections of many different medications, including contraceptives. For years mobile teams in rural Thailand have administered DMPA without difficulty (150). Community workers in rural village dispensaries have administered injectables in Haiti and Jamaica (241, 248). In Matlab and other areas of Bangladesh, injectables have been provided through community-based distribution projects (9, 108). In Mexico and Egypt social marketing programs sell monthly and 3-month injectables in retail outlets (225). No doubt the new injectables and injected microspheres can be delivered through the same channels.

To offer injectables or implants, programs need to meet the following requirements:

- Thorough training for workers (see below);
- Sufficient staff, particularly in community-based programs, to ensure that field workers can visit women on schedule;
- An accurate and simple record-keeping system to keep track of schedules;
- Medical back-up for heavy bleeding, a rare but potentially serious side effect;
- Sufficient supplies of contraceptives and other necessary equipment—including syringes, disinfectant, and autoclaves—from one source. In a pilot program in Haiti lack of DMPA accounted for 6 percent of discontinuations (241). In a community-based program in Abhoynagar, Bangladesh, field workers had to collect equipment from several different sources and so were often unable to give injections on schedule (108).
- With a long-acting implant, such as Norplant, planning to assure that women can have the implants removed any time they want and a system to notify women when the implants should be replaced.

Training

Training all health workers is essential to introducing a new method. For any of the implants and injectables, training must cover:

- The manual skills needed to deliver services, such as administering injections or inserting and removing implants;
- Sterile technique, which is essential for all implants and injectables;
- All characteristics of the method—indications, contraindications, side effects, effectiveness, and duration of action—so that health workers can help clients make informed choices;
- Risks and benefits of the method compared with other family planning methods available;
- Counseling techniques;
- Management of complications, especially heavy bleeding;
- Care of equipment and storage of supplies (in a clean, dry place; refrigeration is not needed);
- Follow-up of clients;
- Record-keeping (14, 126).

Certain training requirements are specific to Norplant implants. A model training curriculum now being developed requires each trainee to perform five insertions and five removals (166). Adequate practice in removals may be hard to obtain. Where Norplant is just being introduced, trainees often will not be able to practice removals immediately (190). PATH/PIACT has developed an artificial arm for

What Women Want to Know About Norplant

What are women's major concerns about Norplant implants? The Program for Appropriate Technology in Health/Program for the Introduction and Adaptation of Contraceptive Technology (PATH/PIACT) asked new users in the Dominican Republic, Ecuador, Indonesia, Kenya, the Philippines, Sri Lanka, and Thailand. Not surprisingly, the women had many questions, such as:

- Does insertion hurt? How long will it take?
- After the implants are inserted, will they move around in the body?
- Will people be able to see the implants?
- Will they look ugly?
- Do the incisions for insertion and removal leave scars?
- Will the implants be uncomfortable?
- Will the implants break if they are touched or bumped?
- Will the implants make it hard to move the arm?
- Can users still work? Will the implants cause weakness? (184, 274)

During counseling health workers should address these concerns as well as describe effectiveness and possible side effects. Women need to know that they will receive a local anesthetic for insertion and removal and that neither procedure is painful. Insertion takes 5 to 10 minutes. Removal takes a little longer—usually no more than 20 or 25 minutes. The implants are inserted just under the skin, not in a vein, as some women mistakenly thought. The incisions for insertion and removal leave little if any scar. If possible, during counseling a woman should have a chance to hold implants in her own hand so she can see that they are soft and flexible. Once inserted, the implants will not move, do not cause any pain, and will not break even if they are bumped or if a woman carries her child in her arms. After insertion, a woman can do any kind of work that she did before. Neither Norplant nor any other hormonal contraceptive weakens a user or her husband.

The implants are sometimes visible under the skin. Usually they look like a vein but without color (184). Few users are troubled by this. In an early clinical trial, when implants were routinely inserted in the lower arm, about 40 percent of acceptors reported that family members or friends had noticed the implants. Even so, only 7 percent of users considered the appearance of the implants to be the feature that they most disliked (237). Now implants are often placed in the inner side of the upper arm and so are less visible.

teaching insertion, but a device for teaching removals is still being developed (250).

Practice with removals is important (see box, p. K-62). A practitioner who has not had hands-on experience may have problems or may be reluctant to remove implants, especially if the woman has not used them for a full three or five years (186). Even if doctors perform removals during training, when Norplant is being introduced they may not perform another for several years. Thus periodic refresher courses are needed.

There are several ways to ensure that health workers are trained in removal so that women can have their implants removed on request. One approach is to teach practitioners in two stages. In Sweden training started just after Norplant was approved, in 1985, and covered only insertion technique. A second segment of training will teach removal techniques when women want to stop using Norplant (190). Another approach is to train just a few practitioners in removal at first and refer all removals to them. In Indonesia central removal centers have been set up (165). Practitioners also can be trained at these centers.

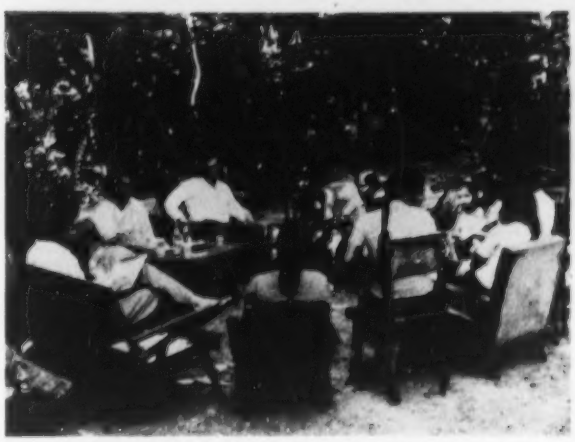
The Population Council has established four international training centers—in the Dominican Republic, Indonesia, Chile, and Egypt. In 1985 and 1986, 28 doctors from eight countries were trained at the Dominican Republic center; at the Indonesian center 13 doctors from India, 4 from China, and 10 from five other Asian countries were trained; and 4 from Africa were trained in Finland (183, 187, 250). In Thailand, where Norplant was approved in 1986, the Ministry of Health has set up 17 training centers. About 700 doctors were trained by early 1987 (183). The model training curriculum, developed by the Association for Voluntary Surgical Contraception, the Population Council, PATH/PIACT, and Family Health International, calls for a 5-day program (14). Plans are being made to test the curriculum in several countries (125).

Sterile technique has always been important with IUDs, injectables, and sterilization. Now the risk of transmitting the virus that causes AIDS—acquired immune deficiency syndrome—makes it essential. Worldwide, more than 45,000 cases of AIDS have been reported as of March 1987 (299), and neither a vaccine nor a cure has been found. The human immunodeficiency virus (HIV), which causes AIDS, is transmitted sexually and also in blood. A number of researchers have suggested that, if contaminated needles are used in health clinics, they could transmit HIV (35, 156, 157, 175, 179, 298) (see **Population Reports**, *AIDS—A Public Health Crisis*, L-6, July-August 1986). There is no evidence yet that this has taken place. Many other serious illnesses, including hepatitis B, also are transmitted by contaminated needles. Maintaining sterile technique can be difficult when syringes, other instruments, and the equipment to disinfect them are in short supply. Even under these circumstances, however, health workers should never risk infecting their clients by using unsterilized instruments. (For instructions on disinfecting instruments, see box, p. K-63.)

Information and Counseling

In addition to health workers, other key audiences need education and information:

- Family planning program and donor agency administrators, government officials, and policy-makers who allocate funds and establish programs.
- Potential users, who need to know the risks and benefits of various methods before they can make an informed choice. Also, counseling on possible side effects can ease women's concerns, increase their satisfaction with the method, and reduce discontinuation rates (234).
- Journalists, broadcasters, and other communication media personnel, whose words and opinions reach many people.



In Sri Lanka a focus group discusses Norplant. Information from sessions like this was used to develop booklets explaining Norplant to users and potential users. (Courtesy of PATH/PIACT)

Informing the public about new contraceptive methods should begin as soon as the products are ready for widespread testing. Communication programs should continue after products are approved to keep potential users well informed, to combat any rumors that may arise, and to ensure that current users will return when they should.

For Norplant, the Population Council, PATH/PIACT, and Leiras Medica have developed special information materials. The material for administrators and health workers includes comprehensive information packets reporting scientific data; training guides on insertion and removal; and a newsletter, *Norplant Worldwide*, that describes the latest research and program experience (85, 144, 180, 194). In addition, Population Council experts and Norplant researchers meet with family planning officials and make presentations at scientific meetings.

For potential users PATH/PIACT and the Population Council have developed information pamphlets in local languages and adapted to local audiences in Ecuador, Indonesia, the Philippines, and Sri Lanka (see photos, pp. K-59, 83). A Spanish-language version for Latin America has been completed, and an African version in English and Swahili is being prepared (185). The pamphlets are meant to be used during counseling to reinforce the information given to clients (185).

Thorough and sympathetic counseling is important for all methods, old and new. During counseling sessions, health workers and clients should consider several issues—the woman's age and health, whether she and her husband want more children, how easily she can come back to the clinic for supplies, and the availability of supplies for temporary methods. For some couples, one of the new long-acting methods may offer distinct advantages; for others, established methods such as oral contraceptives or con-

doms may be preferable. As a long-acting method, Norplant is especially appropriate for women who do not want any more children but do not want to be sterilized or cannot obtain voluntary sterilization as well as for women who want a long interval between births. Also, since Norplant contains no estrogen, it is less likely to cause some of the side effects that occur with combined estrogen-progestin oral contraceptives. Thus Norplant may be preferable to oral contraceptives for women over age 35, for whom estrogen contributes to an increased risk of cardiovascular side effects. The injectables, injectable microspheres, and shorter-acting implants may be best suited for women who are spacing their children and also have convenient access to clinics or pharmacies. None of the new methods has been thoroughly tested in lactating women. Studies of DMPA, NET EN, and Norplant, however, suggest that the progestin-only methods have no harmful effects on breast milk composition or production or on the breast-feeding infant (see pp. K-63, 73).

If a woman chooses Norplant, counselors must make sure she knows that:

- She can return to the clinic or center to discuss any problems and concerns;
- She can have the implants removed whenever she wishes, for any reason whatsoever;
- Irregular bleeding is common with Norplant; however, in many women irregular bleeding diminishes with time;
- In the rare instance that pregnancy occurs, the implants should be removed immediately.
- In addition to suspected pregnancy, she should return immediately if she has severe abdominal pain, heavy vaginal bleeding, arm pain, pus or bleeding at the insertion site, repeated severe headaches, or blurred vision.
- The 6-capsule Norplant system is effective for five years and then should be removed; preliminary trials show that the 2-rod Norplant-2 system is effective for at least three years.

About half of Norplant users keep the capsules for five years. What is the best way to remind them when the capsules need to be replaced? Several approaches are being discussed. One possibility is to contact users by telephone, mail, or personal visit. This is not always feasible, however, and in large programs it would be very expensive and time-consuming. Another approach, sometimes used with IUD users, is to give each woman a card printed with the date for removal. The cards could be color-coded by the year that the implants were inserted. Three or five years later messages could be posted in clinics and broadcast over radio and television advising women who have cards of a specified color to come to the clinic to have the implants replaced (193).

Postmarketing Surveillance

Experience with oral contraceptives and IUDs has shown that some side effects and some benefits of contraceptives are not discovered immediately. The animal and clinical trials required in most countries before contraceptives are introduced ensure that contraceptives are safe and effective in the short run. Only continued postmarketing surveillance of large numbers of women, however, can detect side effects that are rare or appear only after a long period.

Some of the hormones used in the new contraceptive methods—levonorgestrel and norethindrone—have been used for years in oral contraceptives. Their safety and side effects are well-established. Nonetheless, in new delivery systems they may behave differently. Thus surveillance of these new methods will be needed. Other progestins, such as norgestimate, ST-1435, and the new levonorgestrel esters, are being tested for the first time. Postmarketing studies are particularly important for these progestins.

Among the new contraceptives, only Norplant implants are on the market in several countries. WHO, the Population Council, and FHI are collaborating in setting up a large prospective study to look for any medium- and long-term effects of Norplant use. The study, which will be coordinated by the WHO Special Programme of Research, Development and Research Training in Human Reproduction, will involve 5,000 Norplant users and 5,000 controls from 10 to 12 sites in developing countries. The pilot phase of this study, involving some 450 Norplant users and 450 controls, will begin this year at three sites. All women will be followed for at least five years even if they stop using Norplant, and any hospitalization and health problems will be recorded. Any beneficial or adverse effects on health that might be associated with Norplant will be analyzed.

User Satisfaction

Many women like long-acting hormonal methods. They are very effective, convenient, and easy to use. With injec-

NO TIENE QUE ACORDARSE DE USAR NI TOMAR NADA

ESTA CONTENTA; NO LE DUELE; NO TRAE NADA ADENTRO

In this pamphlet from APROFE in Ecuador, a woman tells others why she is happy with Norplant: the implants do not hurt, and she does not have to bother with other contraceptives any more.

tables and implants, women can be assured of almost complete contraceptive protection without having to take a pill every day or use a barrier method with each act of intercourse.

Wherever injectables have been available, they have been popular. In many developing countries people would rather take medicines by injection than orally, perhaps because they associate injections with the antibiotics that have been so effective in controlling communicable diseases. Also, injectables afford privacy that appeals to some women. A woman can obtain injections outside the home without her husband's or family's knowing. Some women prefer monthly injectables to the less frequent DMPA and NET EN, according to a Mexican study, because the monthly bleeding is a good reminder to obtain the next injection (64).

Implants have been readily accepted in many of the countries where they have been tested. Some researchers worried at first that women would fear the insertion procedure or dislike the fact that the implants sometimes are visible under the skin (286). Initial experience with the method has obviated such fears. In Indonesia, for example, 57,000 women chose the method in the year since it was approved by the Indonesian Drug and Food Authority (85).

Changes in bleeding patterns remain the major cause of dissatisfaction with long-acting progestin methods. Amenorrhea is perhaps the most disturbing change because women cannot be sure that they are not pregnant (98, 154). Also, some women think that regular menstruation is essential to good health. Prolonged bleeding or spotting also can be disturbing, especially if social or religious customs restrict the activities of menstruating women.

The new long-acting methods now becoming available will offer women more choices at every stage in their reproductive lives. Developing good methods is only the first of many steps to making them available, however. Effective distribution, marketing, and information and service programs also are essential so that potential users really have a choice of these new methods available to them.

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